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EDITORIAL.

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MALIGNANT TUMORS. This is a very interesting subject, which occupies in comparative pathology a very important place, although it is, comparatively speaking, only recently that valuable bibliographic documents have been published. The field has taken such a wide extent and the investigations have become so numerous and important, through the rich production of elements for study which veterinary schools have offered, that today veterinarians are in possession of documents relating to malignant neoplasms among domestic animals, which are given to them by many professors of the schools, where their laborious investigations have found abundant material.

Prof. G. Petit, of Alfort, who for years has given special attention to the study of cancer and similar neoplasias, and has gathered a most interesting and rich collection of preparations relative to this subject, has published in the *Recueil de Médécine Vétérinaire,* a very valuable article which he has entitled "Generalities on the Malignant Tumors of Domestic Animals," and which, although it contains but generalities, illustrates facts and offers conclusions of immense value.

First of all, he advances what he considers a fundamental conclusion, viz.: The Cancer of Animals is Essentially Identical to the Cancer of Man—there is no essential difference between them.

Cancer is as frequent in domestic carnivorous animals as in man; in dogs more than in cats; but this does not prove that cancer might be a function of alimentation, as suggested by some. Herbivorous animals are frequently affected with cancer. A common and banal discovery in horses, it is also found in cattle, and if the observations relating to its presence in sheep, goats and pigs are but few, cancer does exist nevertheless in them also. Cancer has been found in rabbits and in fowls. Petit has not studied tumors of reptiles nor of fishes, but he nevertheless believes that cancer can and may affect the Totality of All Living Animals.

All the varieties of malignant tumors have been found in animals as observed in man, and if the *age* has but a small influence—although more commonly observed in individuals of certain age rather than youth—there is no scientific evidence either that sex has any influence; with the exception only of tumors of the mammae which in carnivora are found, extremely frequently affected with it.

Chondromas have been found in mammalia and birds. Teratomas, Chondro-Sarcomas, Lymphadenomas, and indeed all the anatomical and histological varieties, of malignant tumors have been met with in animals. And the General Identity of Malignant Neoplasms in All Species is a fact that all comparative pathologists admit to-day.

The theory of the heredity of cancer is at present losing considerable of its ground among its advocates, as there is No Positive Observation of the Hereditary Transmission of Cancer in Animals, and All the Attempts Made to Transmit the Cancer of Man to Dog, of Dog to Dog, of Dog to Rabbit or Fowl, Have Constantly Failed. Even the attempts to graft cancer upon the affected individual himself have also failed.

Yet, there exist few incontestable facts of successful graftings, spontaneous or experimental, of his own cancer to one cancerous individual.

The same remarks can be made in relation to the *contagiousness,* in domestic animals at least. Of course, the facts estab-

lished in relation to the cancer of mice are different; as inoculable and contagious as it is and has been proved to be, it is altogether peculiar and the conclusions to be derived from it are far from being applicable to the cancer of other species.

In relation to the Pre-Cancerous State, Considered in Animals, Petit says that the proof has been made that, in animals as in man, adenomas, which it is known are ordinarily connected with chronic inflammation, give a good evidence that a precancerous state must also be admitted in animals.

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Numerous examples of primitive malignant tumors of most all the organs have been observed by Petit.

In the *locomotory* apparatus, Fibro-Sarcomas, Osteo-Sarcomas, and Epitheliomas of the jaws have been seen in horses and in dogs; Chondromas of the ribs in cattle.

In the Digestive Apparatus, Sarcomas and Epitheliomas of the intestine have been observed in dogs. Primitive Cancer of the Tongue or of the Jaws are recorded. Parotid Epithelioma, Branchial Epitheliomas in a dog and in a mare. Cancer of the Liver in the various domestic animals. Cancer of the Pancreas is less frequent. Lymphadenomas of the Small Intestine have been seen.

In the Respiratory Apparatus, Pulmonary Epithelioma is frequent in dogs.

In the Genital Apparatus, Cancer of the Vagina, of the Uterus, of the Ovaries and of the Oviducts have been exclusively found in sluts. In the Mammae, especially of dogs or cats, all the so numerous varieties of benignant and malignant tumors found in man may be met with in animals. In Males, the Cancer of Chancroid of the Penis of horses is absolutely identical to that of man. The Sarcoma of the Sheath and Penis, the Sarcoma and oftener the Epithelioma of the Testicle are as frequent as the Teratoma of cryptorchid horses.

In the Urinary Apparatus, Sarcomas and Primitive Epitheliomas of the kidneys have recently been found in horses and

Suprarenal Epithelioma has been observed in herbivorous and carnivorous animals as well. Cancer of the bladder is not rare either in herbivora or carnivora.

In the Thyroid Apparatus, Thyroid Cancer has been seen in horses and dogs, and also one case of *generalized* Parathyroid Cancer in dog.

This enumeration covers only the malignant tumors most frequently observed by Petit in animals, exclusive of many others which, mentioned by other pathologists, tell of the great frequency of those neoplasms in domestic animals.

To resume the entire conclusions of his generalities, Prof. Petit says:

1. Whether it is considered in its pathogeny, its evolution, its macroscopic or microscopic characters, cancer of domestic animals is identical to that of man.

2. It is observed specially in carnivora, but herbivora are not exempt from it no more than omnivora, rodents and even birds; facts from which it results that cancer is no doubt susceptible of affecting, with at least some modifications, all vertebræ.

3. Known statistics of cancer among animals, without having an absolute histological value, are sufficient to demonstrate how frequent it is.

4. The various categories of malignant tumors observed in man (epitheliomas, sarcomas, sarco-epitheliomas, chondromas, lymphadenomas) are found in animals with varied aspects. The shortness of life in animals does not allow of its establishment, as easily as in man, the influence of age nor the one less precise of sex, yet cancer is no doubt more frequent in the second half of existence of the individual.

5. There is no fact, well observed in comparative pathology, supporting the theories of heredity or contagiousness of cancer.

6. There is in animals a Pre-Cancerous State comparable to those which have been mentioned as existing in man, and they are probably even more common. They are represented specially by Chronic Inflammation, Parasitic Lesions (bots, acarians, cys-

ticercus, etc.) and Adenomas (thyroid gland, mammae, liver, mucous membranes, etc.).

7. In relation to the origin and primitive seat of malignant tumors, the data taken from human pathology agree exactly with those of comparative pathology.

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ÆROPHAGY—SIALOPHAGY. Lately ærophagy has been the subject of many interesting communications, and to-day the history of this affection is widening considerably.

The term of Ærophagy is comparatively of recent origin. created by Bouveret in 1891, it designates the action of allowing the entrance, willingly or otherwise, of a certain quantity of air in the superior digestive halls (œsophagus or stomach). However, it is only since 1901 that the word was admitted in medical phraseology and recognized as the ordinary cause of those so-called tympanitic or flatulent dyspepsias.

But the presence of a certain quantity of air in the digestive tracts, especially the stomach, says Doctor G. Schreiber in the *Presse Medicale,* is not always the indication of a pathological fact. If with radioscopy a normal subject is examined, either with an empty stomach or after a meal, there will always be found in the superior part of the gastric pouch a clear spot, revealing the atmospheric air which will have penetrated in the stomach by deglutition.

Physiological ærophagy is met with at all ages, even in nursing babies, and when the intragastric tension resulting from it becomes too strong, the stomach relieves itself automatically of the superfluous air; the cardia opens and an eructation takes place. To the clinical point of view, if a sufferer is interrogated, he will say that those eructations come in series, one or several times a day. And if he is asked to show you one of these attacks, he will bend himself slightly forward, stop speaking, close his mouth, lower the head and then bring out wind; first in small quantity and at intervals apart from each other, and then more frequent, loud, and perhaps improper. In fact during

the first step, when the mouth is closed, the man swallows a certain quantity of air instead of throwing out some. It is he who promotes the crisis and repeats it at his will.

All ærophages are not alike. With the ærophagy by deglutition, which may be noiseless or loud, there is the ærophagy by aspiration. And according to the depth in which the air has penetrated in the digestive tracts, there is recognized a pharyngo-œsophageal, or, again, a gastric form. And then again, carrying the division further, in human pathology there is the distinction of some ærophagies, such as when there is no buccal expulsion and where the introduced air passes through the pylorus into the intestines and gives rise to gaseous distension of the abdomen. Or, again, there are dramatic, severe ærophagies which may assume such characters as to appear as cases of angina pectoris, acute asthma, cardiac dyspnœa or uræmia.

The symptoms, diagnosis and prognosis of this affection are undoubtedly justifying the attention of physicians, and in relation with the above consideration of the subject the study of comparative pathology on the simple non-eructating or dumb ærophagy or sialophagy of horses made by Lieutenant-Colonel Pecus, army veterinarian, will prove interesting.

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If the loud, spasmodic ærophagy or redhibitory crib-biting of horses is well known, at least from the symptomatic point of view, it is not the same with sialophagy, or the simple ærophagy, the one without eructations.

Simple ærophagy, or noiseless deglutition of an exaggerated quantity of air is characterized by deglutition of saliva, which are the causes of an abnormal arrival of air in the stomach. Simple ærophagy has its origin in the increase of the salivary secretions. The ptyalism is abundant between the deglutitions. hence is justified the expression of Sialophagy, or ingestion of saliva.

While a healthy horse, in full state of digestion, may remain more than 20 minutes without having a salivary deglutition or

making chewing motions of the jaws, the sialophage animal chews constantly, gabs and swallows his saliva repeatedly. The sialophage horse is a curious one to watch, as its features are typical. Indeed, when the salivary secretion is sufficiently abundant, he closes his lips to hold it in his mouth. Then he has chewing motions of the jaws and swallows. He then stops, remaining quiet for a few seconds or one or two minutes and then goes over the same process again. To observe these symptoms well, says Mr. Pecus, one must examine the horse preferably half an hour or one hour after the end of a meal. If the manger or rack are clean and the bedding cannot be reached, the horse will soon begin his ordinary vicious habit.

All these are generally preceded by a licking, more or less active, on the manger, then a few chewing motions of the jaws; the cheeks become fuller, so as to form in the mouth a ball of air which is then swallowed with more or less saliva; there is no noise, no eructations. It is the noiseless crib-biting.

What becomes of the swallowed air? Not being permitted, as in man, to be rejected through the œsophagus, it goes in the stomach, which becomes dilated; or, again, passes in the intestines and gives rise to borborygms and tympanitis.

Sialophagy is a complication of old gastritis, and the ptyalism proceeds from a reflex action, having for starting point the gastro-intestinal terminations of the pneumogastric. A predisposing cause to this habit is the sedentary life of the horse and its being attached, secured to the hay rack. The severity of sialophagy rests entirely in the nature of the digestive trouble that accompanies it. It may improve and get well by proper hygienic measures; anti-cribbing collars are very essential and above all freedom in a box-stall.

The most serious question of simply ærophagy is that it often changes and becomes eructating and makes true wind-sucker invalids, as they are denominated by veterinarians.

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A Specific Disease of Herbivorous Animals in South America. MM. Rivas and Zanolli have published in the *Revista*

de la Facultad de Agronomia of Veterinaria de la Plata an interesting study of a specific disease of herbivorous animals in the region of the Andes, which is known in South America under the name of "Tembladera," and which affects horses, cattle, sheep and goats. It prevails extensively in the northern parts of the Argentine Republic, Bolivia, Chili and Peru. A concise account is here presented, extracted from the *Revue Generale.*

The authors have divided the series of symptoms into three periods: In the *first,* which lasts one day, the symptoms appear from 6 to 10 hours after the ingestion of a plant, the "Festuca," and consists in slight fibrillar contractions of the gluteus, triceps brachialis, quadriceps cruralis, and pectoralis muscles. The back is arched, the coat erected and the animal has a dull appearance. He is said to be *picado* (touched). All the principal functions are still normal. After a few hours there are swinging motions of the body, either in lateral or longitudinal direction. They are very slight and quite difficult to make out. There is general hyperesthesia and pressure over the vertebral column or sacro-lumbar region is readily felt by the animal. The digestion, circulation, urination and intellect are normal.

The *second* period is essentially characterized by marked exaggeration of the swinging of the body, the animal is *machado* (drunk). He makes great effort to stand, is constantly moving on his legs to keep his equilibrium. He rushes forward to almost drop on his nose, or suddenly backs on his hindquarters so as to sit on his rump, or, again, balances his body sideways, standing on one lateral biped. It is not rare to see him with his four legs stiff and wide apart so as to widen his whole base of sustentation. There is also great constipation, yet no fever, no disturbance in circulation nor respiration. Great retention of urine is a constant manifestation which requires the use of a catheter to be relieved. The muscular contractions are stronger than in the first period and sometimes have a clonic character. The hyperexcitability is always very great.

After a length of time varying between 2 and 7 days the *third* period begins. The animal remains lying down, struggles much

with his legs, his tail is constantly agitated. There are intermittent contractions of the superior and inferior cervical muscles. The animal moans, curves his spine and his legs are very rigid. Later there is general debility, the pulse becomes very accelerated —over 100 to the minute—but the respiration remains normal. The temperature which at the beginning of this period was low, runs down rapidly to 30°, 35°, or even 34°, when death takes place after an agony lasting more or less. This period lasts from 1 to 3 days.

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The lesions, experimental studies and the treatment complete the article of MM. Rivas and Zanolli.

The subcutaneous connective tissue in some parts of the body is infiltrated with sero-bloody infiltration, due to the knocks and rubbings that the animal has inflicted to himself during the process of the disease.

The apparatus of locomotion presents nothing abnormal, neither do the organs of the thoracic cavity.

In the abdomen, the peritoneum and the cavity are normal. The stomach contains some undigested food. The mucous membrane of the right sac of the organ is slightly catarrhal. The small intestine and especially the jejunum have many congestive spots. The mucous membrane of the cæcum and large colon shows few small hæmorrhagic spots. The small colon contains soft excreta. Its mucous membrane is normal. All the organs of the abdominal cavity are free from lesions. The urinary bladder is always found containing a large quantity of urine.

The nervous centres seem to show the principal lesions. The cephalo-rachidian fluid is normal. It only contains a few rare lymphatic globules. In quantity there is generally more than 100 c. c. In opening the cranial cavity the brain is seen contracted, pale, but otherwise normal. The choroid plexuses, as well as the cerebral and cerebellar, are slightly anemic. The rachidian piamater is congested. The histo-pathological examination revealed nothing abnormal.

In their experimental study of the disease the authors inquire into four questions: 1. If the tembladera was contagious. 2. If it was transmissible. 3. If the micro-biological study could give some information as to its nature, and 4. In what condition did the disease occur.

Their researches have brought them to the discovery that the disease is due to the ingestion of a graminous plant, the *Festuca Hieronymi,* and by no other plant that constitutes the food of animals. But what was the toxic influence of this plant is yet to be found out, as by analysis no alkaloid or other compound could be found. All that could be obtained was the presence of a parasitic mycelium which gave a glutinous substance, special fungus, to which the authors gave the name of *Endoconidium Tembladeræ.*

The treatment suggested is very simple.

To prevent the disease is not to allow the plant to enter into the food of animals, or to destroy it in the fields where it grows. To cure animals affected with it, strong purgatives are the indications. Bromhydrate of arecoline, pilocarpine or eserine will cure even animals already at the end of the second period. Yet a general debility, some muscular contractions and swinging motions of the body may remain for a short time afterwards.

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Aponeurotic Graftings. Cutaneous graftings have remained for a long time the only ones resorted to in surgery, but after a while the method took extensive development. Organs and most varied tissues were grafted and from experimental attempts soon entered general practice with more or less success. Evidently, with such progress, it was indicated that tendons and aponeurosis were sooner or later to take their place as important agents in surgical arsenals. Of course, it was to be feared that their weak vitality would cause numerous failures; their structure of dense, fibrous tissues, their limited vascularization, are not favorable conditions for grafting, and daily experience has

shown how easily necrosis takes place in those tissues when they are exposed to infection.

But these were only theoretical fears, and experimental as well as clinical facts have proved that the transplantation of tendons and of aponeurosis, when done under Perfect Asepsy, can succeed, and according to Kirschner, "tissues thus transplanted can remain in perfect condition of life for months and keep their characteristic structure."

This surgeon has indeed performed successfully tendinous graftings. But his studies were principally directed in the use of aponeurotic strips. Easily taken from any superficial aponeurosis these strips form a material for grafting of superior quality, which can be obtained readily, even in large quantity, and can be used either in elongated bandelets or in wide sheaths for all varieties of tendinous autoplasties. With them broad loss of tissues can be closed. Their thinness is a warranty of easy nutrition, their elasticity is superior to that of tendons and their resistance is very great. The experiments of Kirschner have given great and constant good results, and the transplanted aponeurotic pieces have always remained living and have adapted themselves to their new functions. In one dog the entire thickness of the abdominal walls had been resected, except the peritoneum and the skin. In its place a quadrangular aponeurotic piece, taken from the fascia lata, had been inserted, and the dog recovered without having any eventration.

The method has made great progress, especially among German surgeons, and the possible applications of the new agent are very numerous—tendinous autoplasties, reconstitution of articular ligaments, making up of the walls of cavities of the body such as the abdominal, the peritoneum, articular capsular ligament, reinforcing imperfect or weak sutures such as the tendinous, those following laparotomy and especially in rebel hernias, etc.

Among some of the many where it has been employed, which have been recorded, there are: The transplantation of a muscle to a new insertion; to prevent the reproduction of pathological adhesions between neighboring tissues; as a means of consolida-

tion of sutures; to secure and fix the urinary bladder in a given place after laparotomy; to close a large wound of the abdominal wall through wide loss of tissue; to constitute a material of structure strong and resisting, etc.

From these brief extracts it is shown that, at least in human surgery, the use of aponeurotic structure has a wide field of opportunities. What may these be in veterinary surgery? Perhaps very much more limited as far as that of large animals is concerned, but there are, nevertheless, many instances where that of smaller animals can find indications of resorting to the advantages that are laid down and recorded in human surgery.

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An Epidermis Proliferating Agent. Under the name of Scharlach-rot, or again of Scarlet Rot, a German preparation has been recently used quite extensively in human surgery as a keratinizing agent, upon which an army veterinarian, Mr. Picard, in the *Revue Generale* called the attention of the veterinary profession on account of the advantages he has derived from its use.

The Scharlach-rot is the amadoazotoluolazo-B naphtol and is the result of the action of the Naphtol-B upon the diatozed amadoazotoluol. In a state of purity it is a powder of a dark, reddish-brown color, insoluble in water, easily soluble at a boiling heat in alcohol, acetone, ether and benzol. At ordinary temperature it dissolves in chloroform in the proportion of 1 to 15. It easily dissolves also in fats and oils and by heat in vaseline and paraffine. First used for coloring microscopic preparations, it is only recently that its therapeutic value has been found in the treatment of wounds.

In Germany, Schmieden experimented first with it; then Fisher and others. In 1909 Helmholtz in America published an important article under the heading of "Experimental Epithelial Proliferation of the Skin and Mucous Membranes." Yet it is Schmieden who was the first to resort to it for the treatment of

granulating wounds Then came others who followed his example in Germany, America, France, etc.

It is after having witnessed the results obtained by some surgeons and principally in the case of a very large burnt wound of the thighs of a man, that Mr. Picard decided to try it. And he relates the following case:

A mare had received a bad injury on the right posterior leg, involving skin, subcutaneous tissue, and dividing incompletely the tendons. Notwithstanding all kinds of treatment and dressings there remained back of the tendons a very hard, fibrous tumor as big as an orange, and no complete cicatrization could be obtained. There was besides the ugly sore an abundant discharge running from it. Another attempt had been made by making two long cutaneous incisions on each side of the growth, dissecting and removing it. The edges of the wound, which was quite large, had been brought together with closely applied sutures, and a dressing covered the whole. Soon the mare objected, threw the dressing off, the stitches broke and there remained an enormous wound, gaping, of bad appearance, and not granulating.

Then Sharlach-rot treatment was begun.

After complete disinfection, some ointment of Sharlach-rot was spread on a piece of gauze; this was laid over the wound and kept in place with a bandage just tight enough to hold it in position and so that the mare could not object to it. This dressing was changed every two days. After one week the process of epidermization was very plainly noticed on the edges of the wound. Cicatrization had begun and progressed. After a few days it seemed as if there was an arrest. The Scharlach dressing was left off for a couple of days and then taken up again, with the result that in one month from the time the treatment was begun, recovery was complete. Since this success Scharlach-rot has been used with wonderful success in broken knees, in granular dermatitis, in varicose ulcers, in scratches, and in all kinds of cutaneous chronic sores or wounds.

The ointment recommended is one made of 5 per cent. The most practical way to prepare it is to dissolve the Scharlach in

chloroform, and when this has evaporated, add vaseline and mix well.

It ought to be tried!

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ANAPHYLACTIC SERIAL ACCIDENTS. In his opening address to the Congress de Médécine which was held here on the 13th of last October, the president, Prof. Landouzy, well known to those of our readers who went to the International Congress of Tuberculosis in Washington two years ago, said: "The anaphylactic state is no less mysterious than that of immunity, and alone pathological physiology has permitted Charles Richet to establish that fecund law which put modern pathology and therapeuty in endless suggestions. Neither the most powerful microscope nor the finest chemical analysis can explain the state of sensibilization of anaphylactized subjects."

But yet investigators and experimentors are searching, if not the explanation, at least the means to overcome the accidents met in it and are trying to find better practical applications than those that are already known.

The *Centralblatt für Bakteriology* has published contributions relating to this important problem by A. Fonteyne, but the methods spoken of are difficult of application.

In one, leaving aside the sure method of the heating process at 100 degrees during 15 minutes, which has the objection that it destroys the immunizing properties of the serum, he proposes the mixture of serum of rabbits treated with serum of rabbits, guinea-pigs or horses. Or, again, in a second, better instead of mixing two sera anti, a mixture is recommended of serum of guinea-pig with a serum of horse, viz.: a foreign serum and the homologous of the species to be tested. The mixed serum, horse-serum of guinea-pig, in equal proportions, after a contact during 8 days, is free from anaphylactic toxicity.

At a late seating of the Society of Biology, MM. Carnot and Slavu have presented another new method by which accidents of serial anaphylaxy can be avoided. Its simplicity recommends

it. They recommend the use of an extemporaneous mixture of the serum to inject, with a given quantity of muriatic acid. This addition prevents the production of anaphylactic accidents in hypersensibilized guinea-pigs, without interfering with the antitoxic properties of the serum. It is sufficient to add the acid in the proportion of 3.3 per 1,000.

Whether this method would give similar results in the prophilaxy of serial accidents remains to be demonstrated.

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BIBLIOGRAPHIC NOTICES. I have received among our exchanges two special issues, for which with my thanks I may be permitted to give a little more notice and offer my welcome.

The first, to which I believe I have already alluded, is the *Revista de Medecina Veterinaria* of Montevideo, and the second the October number of the *Annales de Médécine Véterinaire* of Belgium.

In the *Revista,* which was accompanied by several of its subsequent issues, there is the announcement of the Veterinary School of Montevideo, with our good and truthful friend, Dr. D. E. Salmon, as director. This number is handsomely illustrated, and the general program of the school tells that veterinary science is certainly going to assume in Uruguay the place it ought to occupy when are taken into consideration the immense interests which are engaged in that country. Among the interesting contents of the eight first numbers of the *Revista* issued, there is a lengthy and valuable contribution on "Contagious Diseases, Piroplasmosis, Scabies and Bacteridian Anthrax," by Director Salmon.

The October issue of the *Annales of Bruxelles* had to be what it is, viz.: a special number! Ordinarily the monthly issues of this journal, rich as they are in their excellent and valuable contents, have the ordinary aspect of similar publications. The special number for October is more than twice its ordinary size

and, although it differs in its contents from the others, it is one that will meet with great success.

In it indeed is related the magnificent ceremonies that took place for the inauguration of the new Governmental School of Veterinary Medicine at Cureghem es Bruxelles, and of the great meeting of the Belgian Veterinary Federation, with also a full description of the grand festival attached to the ceremony.

The history of the school is given in full in the speech made by Director Dupuis, who, besides the general program of studies carried out, now gave a brief biographic sketch of several of the professors and directors who, since the foundation of the school in 1794 to our day, have illustrated that institution.

The number contains a series of numerous plates which give a very good idea of the general disposition of the new school, which covers a surface of four hectares—say about four acres—two of which contain no less than nineteen buildings for the various departments, laboratories and services necessary to carry out the work which is expected from the learned faculty.

Heretofore, I think, foreign visitors of continental veterinary schools were satisfied with Alfort, Berlin, London or a few others, but now they will have to add Bruxelles to their program as one among the most important and the finest schools of old Europe.

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To close, let me acknowledge the receipt of "Transactions of the Nineteenth International Veterinary Congress at the Hague," forming Volume III., and containing documents relating to the organization of the Congress, the opening and closing meetings, and the *résumé* of the general meetings. This is to be followed by a Volume IV., where the proceedings of the meetings of the sections will be presented. It will complete the entire history and work of the grand meeting in Holland.

A. L.

THE REVIEW, 1910—BRIEF RESUME.

The many expressions of appreciation of the quality and high character of the REVIEW, that are wafted in with every mail, has led us to believe that it might be interesting to our readers, who are "the veterinarians of America" (with few exceptions), and a goodly number of those of every civilized country of the world, to see grouped together in a condensed form a list of the good things the REVIEW has given them during the past year, that has caused them to vote it "at the top in veterinary journalism in America," to state "its position in the field of current veterinary literature is assured"; and to say of it, "the REVIEW is at once progressive and conservative"; and many, many other things that we will not take space to reiterate here. As neither of our two yearly volumes begin or end with the year, we cannot refer to either of them in a yearly report, but will present as briefly as possible the matter contained in the twelve numbers from January, 1910, to December, 1910, inclusive.

We have during that period, given our readers nearly sixteen hundred pages of reading matter. The editorial section devoted to *European Chronicles* has dealt with eighty distinct scientific subjects that have been gleaned from the current veterinary and other scientific literature of Europe, that has been carefully read and placed in a concise form in English, ready for digestion by our American and other English readers. We have published ninety *Original Articles,* including those from the most advanced veterinarians and scientists in America. We have published eighty-one *Case Reports* from American veterinarians, and one hundred and eighty-three others of the most interesting character, in a condensed form through our *Abstracts From Exchanges.* Our original articles and case reports have been illustrated by seventy-three cuts. We have given full reports of the proceedings of sixty-seven *Society Meetings;* published twenty-eight communications to the veterinary profession through our *Correspondence Department,* and ten impor-

tant communications relative to army veterinary matters through our *Army Veterinary Department.* In addition to the above statistical data, we have published thousands of news items, some bearing a social aspect, and many, many others carrying important matters of news to the profession, and frequently valuable information gleaned here and there from our large list of exchanges.

This being our first number in 1911, and coming out somewhat later than has been customary, we do not wish to give the impression that that is to be a new feature established with the new year, but will explain it by the fact that our editor has been ill for the two weeks in the month when his presence was most needed, and that most of his work on the present number has been done in his room, some of it in his bed. However, we hope the number will "pass muster," and wish you all a "HAPPY NEW YEAR."

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CHRISTMAS EDITIONS OF AGRICULTURAL PAPERS.—It seems but yesterday that we were reveling in the Christmas number of the *Breeder's Gazette,* of 1909, but the sight of the last beautiful Christmas edition, with the sweet-faced child, happy amongst the rich-colored ears of corn, on its front cover-page, reminds us that a year has slipped by since that time; and we are constrained to admit that the Holiday edition of 1910 is even handsomer than that of a year ago.

The *Farmer's Advocate* has also entered into the Christmas spirit as only Canadians can, and its Holiday number is a most splendid one. Its leading article by Dr. W. C. Murray, President of Saskatchewan University, on "Rural Education for the Canadian West," with a splendid picture of President Murray in the centre of the first page, is most interesting. The number all through is excellent. More than half of one of its large pages is occupied by "Pomes for Christmas."

ORIGINAL ARTICLES.

THE DIAGNOSIS OF RABIES.*

By John Reichel, V.M.D., Philadelphia, Pa., Chief of the Laboratory of the Pennsylvania State Livestock Sanitary Board.

"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."

Introduction.—The terms rabies, lyssa, canine madness or hydrophobia are applied to a specific disease to which all warm-blooded animals are more or less susceptible. All of the terms except hydrophobia are appropriately applied to the disease in dogs and the lower animals in which the sum total of the usual symptoms at times is an expression of rage, madness or rabid condition. The dread of water as a symptom of the disease is expressed in the term hydrophobia, and as this symptom is not seen in animals, but in man, the appropriateness of the term of the disease is at once apparent.

Late in the eighteenth century a highly acute and fatal disease among dogs of Massachusetts near Boston was recognized as rabies and before the close of that century, rabies was also recognized in Pennsylvania. Since then it has been a matter of interest to note the spread of the disease from the East to the West, which has been most rapid during the last two decades, and the disease is now known to exist in every state in the Union. In the Eastern states, particularly New York and Pennsylvania, the disease has taken the proportions of alarming epizootics within the past two years.

Infection, under natural conditions, usually occurs following the bite of an infected animal, the saliva containing the specific

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cause or virus. Experimental transmission may be successfully accomplished by the injection of the portion of the brain tissue, spinal cord, saliva, supra-renal glands, lachrymal secretion, pancreatic secretion or milk of an animal with rabies. From the results of the inoculation of such material, it has been shown that the virus is present in the brain and spinal cord in its purest form and more constant in those tissues than in the saliva or the other secretions. Accidental inoculation with the subsequent development of the disease may follow the penetration of slight and superficial wounds with saliva, etc., containing the virus. Symptoms do not immediately follow the bite of a rabid animal or injection of virus, but as in all infectious diseases, particularly those caused by protozoa, there is a period during which nothing unusual is observed. This period of incubation, *i. e.*, from the time of infection to the beginning of symptoms, varies in the different animals, depending upon the virulence of the virus, dose, seat of inoculation and susceptibility of the victim. The symptoms in the majority of cases are slow in developing, and as a rule an animal when attracting attention has shown symptoms for many hours, and not infrequently for a day or two. In that infected animals may show symptoms of the disease one or two days before the symptoms attract attention, the question naturally arises, how long before actual or noticeable symptoms is it possible for an animal developing rabies to transmit the disease by means of a bite or otherwise? Nocard and Roux have shown by experiment that the saliva of a dog is infectious at least three days before the dog shows symptoms of rabies, while in experiments conducted by the Athens (Greece) Pasteur Institute, the virus was demonstrated in the saliva eight days before the dog showed signs of the disease.[1] This conclusively demonstrates that the saliva may carry the cause of rabies, and that the presence of the virus may be demonstrated in the saliva before the animal shows premonitory or actual symptoms.

In establishing a diagnosis, the history, symptoms, gross autopsy findings and laboratory examination are all of importance, but are not all absolutely necessary in any one case, as at

times a clear history of the animal having been bitten some weeks previous by a rabid animal, and the subsequent development of characteristic symptoms following a period of incubation, may be sufficient for an accurate diagnosis. Then again, the symptoms and gross autopsy findings, without any history may be conclusive enough to suggest the possibility of the existence of rabies; and in such a case, the laboratory examination should be relied upon as well as in those cases in which the history and autopsy findings without the symptoms fail to be conclusive.

THE USUAL HISTORY.—The dog has for centuries been known to be the real carrier and most frequently afflicted of all the warm-blooded animals. The often repeated statement credited to Aristotle, who lived from 284 to 322 B. C., "Of these, Lyssa (rabies) causes mania, and whatever is bitten, of these bitten go mad except man"[2] is taken as evidence that rabies existed before the beginning of the Christian era, and strengthens the belief that dogs suffered from madness. Unfortunately, the observations of Aristotle were not thorough enough to note the transmission of the disease from dogs to man. In Russia the wolves are credited with harboring and spreading the disease. The dog and wolf are not any more susceptible to the disease than are other warm-blooded animals, but the dog through the freedom allowed and his habit of exchanging greetings and joining in combat with his kind and other species, exposes himself more to the chances of infection.

The popular belief that dogs are more apt to go mad or develop rabies in summer, particularly during the so-called "dog days"—the time of the year from July 3d to August 11th, when the "dog star," Sirus, is above the horizon with the sun—is not corroborated in referring to Table No. 1, in which it may be seen that during July and August the number of heads of animals suspected of having rabies received at the laboratory was not as large as in many of the other months during 1900 to 1909 inclusive.

TABLE NO. 1.

Heads of Animals Received at the Laboratory of the Pennsylvania State Live-stock Sanitary Board, 1900-1909, Inclusive.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1900.....	..	1	1	1	2	4	5	1	1	2	2	5
1901.....	4	8	2	3	12	2	3	3	3	7	4	4
1902.....	4	7	6	6	6	3	..	1	4	4	2	2
1903.....	3	3	2	1	3	6	..	6	4	7	3	9
1904.....	5	11	9	10	2	6	2	2	4	5	8	2
1905.....	6	9	13	7	7	6	8	5	7	8	7	8
1906.....	11	6	8	7	5	7	3	12	8	8	10	16
1907.....	10	11	5	3	12	9	9	6	9	11	14	9
1908.....	5	4	13	4	14	19	19	18	16	16	10	16
1909.....	22	7	32	20	14	32	12	18	18	20	33	33
Total by Months..	70	87	91	62	77	95	61	72	74	88	93	104

The largest number of heads were received during the months of November and December. As it is a fact that dogs do mingle more in warm weather; therefore, they are more exposed, and should infection take place, with its subsequent period of incubation of four to eight weeks before symptoms develop, the apparent increase in the number of heads during the months of November and December may be accounted for. With the spread and increasing prevalence of rabies, it must be recognized that dogs permitted to run at large, even for short periods at a time, may while at liberty, be exposed to a rabid animal. The owner of a suspected animal will not infrequently insist that this or that animal was not exposed; but in almost every instance some loophole in the confinement of the closest of pets can be discovered. It is well known how eagerly dogs seldom permitted to run at large join other dogs when granted that freedom, thereby increasing the chances of exposure in arousing a passing or sulking rabid dog. In gathering the history an attempt should be made to find out the day of exposure or time of infection. Not infrequently, as proof of exposure, a healing wound, the result of a bite, may be detected on some part of the body.

The period of incubation of rabies in the domestic animals including man is usually within the following number of days:

Man, 14 to 90 days.
Dogs, 14 to 60 days, authentic exception 365 days[3].
Cats, 14 to 60 days.
Cows, 14 to 80 days.
Horses, 21 to 90 days.
Swine, sheep and goats, 21 to 60 days.
Birds, 14 to 60 days.
Rabbits, 9 to 90 days.
Guinea pigs, 8 to 60 days.

It is an exceedingly rare occurrence for man or any of the lower animals to develop rabies following the one hundredth day from the time of exposure or infection, but there are rare instances in which exceptionally long periods of incubation have been observed.

SYMPTOMS.—A careful study of the symptoms of rabies in the dog is of the greatest importance in attempting an ante-mortem diagnosis. The disease is acute in its course, and when symptoms are pronounced, death usually follows in a very high percentage of cases within several days. Pasteur, Roux and Babes are on record as having seen rabies in the dog with recovery after well marked symptoms had developed. These instances are exceedingly rare and should not detract from the general opinion that rabies is always fatal. In a personal observation of a large number of dogs suspected of having rabies, sent to the Veterinary Hospital of the Veterinary School of the University of Pennsylvania during 1906-1909 inclusive, not one dog lived more than eight days with symptoms of the disease.

Two types or forms of rabies are usually recognized—the furious or irritable and the paralytic or dumb. These forms or types are not sharply defined nor always separable. They are more correctly considered as stages of the disease because both are preceded by identical premonitory symptoms. The furious stage is usually followed by the paralytic stage; but not infre-

quently the paralytic stage may follow the premonitory symptoms with the omission of the furious stage.

PREMONITORY SYMPTOMS.—First a decided change in the disposition of the animal is observed. A lively and amiable dog may suddenly become dull; the quiet and unexcitable dog may become unusually alert, more affectionate, demonstrative and exhibit the desire to be caressed. A dog not in the habit of barking may bark frequently without any apparent reason and seem unduly disturbed without cause. The appetite is good and even excessive, and perhaps the animal may eat food as a rule not enjoyed. The increased friendliness is most striking, and other changes in the disposition may be detected. These symptoms may suddenly become more alarming, as the furious stage succeeds the premonitory symptoms, or the dog may seek quiet surroundings with the development of the paralytic or dumb stage.

FURIOUS STAGE.—The dog is increasingly restless. The muscles are firmer and more tense, particularly those of the limbs and back. He responds to the owner's call, but not quickly. The impression is that the dog has some trouble in locating the owner, but recognizes the voice as in health. Coakley has called attention to a symptom he considers pathognomonic, a fixation of the pupil of the eyes. In dogs confined in well lighted cages, the contracted pupil does not appear to be a constant symptom, and not infrequently one pupil is seen much contracted, while the other appears not at all affected. The eyes do appear to be somewhat limited in their movements, and along with the muscle firmness, there is a glary fixed expression. At this time it may be noticed that the dog in lapping seemingly exerts himself more than usual in attempting to drink water. The water when taken into the mouth mixes with the saliva and the constant movements of the jaw and tongue form froth. The desire to drink appears to be increased, which is quite natural with the inability to swallow, owing to a gradual and progressive paralysis of the muscles of the pharynx. The paralysis later extends to the jaw and tongue. With the paralysis well advanced, the dog is

not capable of swallowing, but the desire and attempt to quench the thirst does not abate. The dog will repeatedly plunge his nose into water and make a strenuous attempt to swallow, which at first only causes an increase in the flow of saliva with the formation of more froth. The drooling giving rise to the symptoms popularly known as " frothing at the mouth." Before the paralysis is complete the appetite becomes decidedly depraved, which is another characteristic symptom, as shown in the destruction and attempt to swallow straw, coal, wood or other foreign material. As the paralysis of the pharynx progresses, a significant change in the bark occurs, which is one of the most constant symptoms of rabies in the dog. Occasionally a dog will not bark and nothing will induce him to do so, although he may show all of the other symptoms of the furious stage. The bark in the premonitory stage may be the same as in health, but with the development of the furious stage, the bark is decidedly changed. Instead of a sharp and clear bark, the latter part of the note becomes prolonged and of a higher pitch. The inability to swallow is due to a progressive paralysis of the pharynx. This condition has often been mistaken for symptoms observed when a bone or other foreign body lodges in the throat, and has led many a sympathizer to investigate and thereby expose himself to possible infection. With the progress of the disease, the dog will start out and travel tremendous distances if unhindered. Wide rivers have been successfully crossed. There appears to be one desire uppermost within the beast, to go on and on. It is the rule that an attempt will be made to return home or to go to the original starting place. The appearance of the animal upon his return is worthy of mention. Emaciation is marked; wounds and blood mixed with foreign matter cover the body; the eyes are clouded and expressionless; the mouth is open owing to paralysis of the lower jaw; the tongue hangs loose and usually discolored; the mucous membrane is dry and the lips on the sides of both lower and upper jaws lie in close, changing the general appearance of the dog at times beyond recognition. The change in appearance is a striking one and is as character-

istic as the alteration of the bark. Paralysis of the hind limbs rapidly extends forward, and it is a race between the progressive paralysis and death, whether or not the paralysis will extend to the front limbs and then to the head before death. With the complete paralysis of the limbs and head, the only perceptible signs of life are the movements of respiration. Death usually follows quicky. The onset of the general paralysis is usually considered the beginning of the paralytic or dumb stage of rabies.

PARALYTIC OR DUMB STAGE.—Following the change in the disposition, it may be observed that the dog is in search of a secluded and dark place. He is apt to crawl beneath furniture or furnishings of house or barn, and if not disturbed, die there. Paralysis is the predominating symptom in the paralytic or dumb stage, and as a rule first involving the muscles of the pharynx, then the muscles of the face, causing the lower jaw to hang and the mouth to remain open. Drowsiness rapidly overtakes the animal, and it is difficult and often impossible to arouse him. The paralysis rapidly progresses and death usually follows within two or three days. The usual position of the dog at death is curled up as though asleep. The course of the disease after symptoms have developed is rapid, from two to eight days. The symptoms in man, cow, horse, cat, hog, sheep, goat, deer, rabbit and guinea pig may also be described under the stages premonitory, furious and paralytic, varying considerably in the different species.

GROSS APPEARANCE AFTER DEATH.—The morbid anatomy of rabies is limited as there are no gross changes that are constant or specific of the disease. With the natural death of a rabid animal, the general condition of the body is one of emaciation. Wounds healed and recently inflicted may be found. The eyes are usually covered with mucus or foreign material. The mucous membrane of the mouth may be dry, discolored, blue to black. Where an animal is destroyed during the first stage, the mucous membrane may be excessively moist, the saliva mixed with air may be seen as froth hanging from the lips.

Fig. I. Proper length of neck with head intended for laboratory examination. A—Hippocampus Major. B—Cerebellum.

Fig. II. Showing pneumogastric nerve exposed for removal of nerve ganglion. A—Plexiform Ganglion. B—Sympathetic Ganglion.

The mucous membrane of the pharynx, œsophagus and stomach may be reddened. In the stomach the presence of foreign bodies may be accepted as an indication of a depraved appetite, which should strengthen the suspicion of rabies. The intestines invariably contain but a scant amount of material. The internal organs are apparently normal, but slight secondary changes may be present, such as bronchitis, developing catarrhal pneumonia or small hæmorrhagic focci here and there, etc. The meninges of the brain and spinal cord may or may not be congested. The absence of any gross changes should strengthen the suspicion of rabies.

LABORATORY EXAMINATION.—The importance of an accurate diagnosis made as quickly as possible is well known. In many instances, the history, symptoms and gross appearance at autopsy are not conclusive or as is most frequently the case, they are highly suggestive of the existence of rabies and a laboratory examination must be resorted to. As the laboratory examination is limited to the brain, nerve ganglion and upper portion of the spinal cord, it is sufficient to submit to the laboratory the dog's head and neck (see plates I. and II) cut off close to the shoulders. In shooting an animal through the head, the portion of the brain tissue usually examined is apt to be destroyed and, therefore, it is recommended that an animal be shot through the heart or destroyed with chloroform or strychnine. Of the large animals, horse, cow, hog, etc., the brain may be removed and sent more conveniently and with less expense. Rapid decomposition is prevented when the specimen is wrapped in paper or cloth and packed in a metal can or box surrounded with ice in a shipping box. A metal or wooden bucket containing the specimen wrapped in paper or cloth is considerably used, and serves the purpose well. Glycerin has long been known to have little effect on the virus of rabies and experimental animals may be successfully inoculated with brain tissue immersed in glycerin for months, and as the microscopic examination of the tissue is not much interfered with, in glycerin immersed specimens, the specimens sent to the laboratory in glycerin (water and glycerin equal parts frequently used) are almost as desirable as the fresh specimens.

ANIMAL INOCULATION TEST.—To reproduce rabies with material suspected of containing the virus is absolute proof of its existence in the animal from which the material was taken. It is well known that the saliva carries the infectious material or virus. Proof of this lies in the manner in which the disease is transmitted, under natural conditions, through the bite of an animal with rabies, the saliva being the only material left behind as the bite is inflicted. In the work of Pasteur, in the general study of the disease, he found that of experimental ani-

mals inoculated with saliva containing the virus, a large percentage not only failed to develop the disease, but also that the period of incubation in those that developed symptoms and died was very uncertain. Sound experimental work was therefore impossible until a trustworthy method was found whereby the disease could be reproduced in a high percentage of all the experimental animals inoculated with material containing the virus. Thus, Pasteur was led to use emulsions of spinal cord or brain tissue and it was found that the virus in these structures was least liable to be contaminated, more constant and probably in a more concentrated form. As the seat of injection influences not only the percentage of mortality, but also the length of the period of incubation, cutaneous injections or infection through a wound in the skin, subcutaneous, intraperitoneal, intramuscular and intravenous injections were tried and still the percentage of animals that would not develop rabies was too large and the period of incubation too varied to consider the results uniform. The best results were not obtained until the distance from the point of injection to the spinal cord or brain tissue, particularly the last-named structure, was reduced to a minimum, which was accomplished by injecting material containing the virus directly over the brain or spinal cord, beneath the meninges—subdurally. As a means to demonstrate the presence of the virus, rabbits are generally used. Subdural injections are easily made without any pain to the experimental animal. A 2 per cent. cocaine solution is usually injected subcutaneously over the forehead as a local anæsthetic. An incision is made parallel to the long axis of the head, less than 2 cm. long, a little to one side of the median line, through the skin and periosteum over the frontal bone. The soft tissues are spread apart and a small hole is drilled through the bone or preferably a small trephine is used and a disc of bone is removed about 0.5 cm. in diameter. The point of a syringe needle through which the emulsion containing the virus is forced from a syringe is inserted through the meninges and several drops of the emulsion is injected over the brain. The emulsion is usually made with a piece of brain tissue, diluted with twice

its volume of sterile normal saline solution. Of 117 rabbits so inoculated with brain tissue containing the virus of heads sent to the laboratory during 1905 and 1909 inclusive, 107 (91.3 per cent.) died of rabies on an average of 25.3 days; one in nine days and one in 134 days after the inoculation. These figures do not represent the length of the period of incubation, in that none of the rabbits were kept so as to observe the onset of the first symptoms. The period of incubation is, therefore, shorter by at least 4 days, which would make the period twenty-one days on an average. Several unusually long periods from the time of injection to death were observed among the rabbits included in the 107, of these 66, 85, 110 and 134 days were the longest. Ten (9.7 per cent.) of the 117 rabbits resisted infection. It is the general experience that every now and then a rabbit will resist infection, and for this reason two rabbits are usually inoculated. The mate of each of those that resisted infection died of rabies. For a rabbit to develop rabies 100 days or more after inoculation is exceptional, and it is entirely safe to assume that the virus was not in the suspected material inoculated, or that rabies did not exist if both rabbits are alive at the end of 100 days. In the routine diagnosis of specimens received at the laboratory of the Pennsylvania State Livestock Sanitary Board during 1905 and 1909 inclusive, 313 rabbits were inoculated subdurally; 107 of which developed rabies; 206 failed to give any positive proof of the existence of rabies, of which 129 outlived the 100 days allotted, 53 died of unknown causes, 18 died of septicemia, 3 of cerebral hæmorrhage, 2 of coccidiosis and 2 of enteritis.

Wilson, of the New York Board of Health (1898), was the first to use guinea pigs in the place of rabbits, as the period of incubation in these animals is shorter than in rabbits. Of 36 guinea pigs dead of rabies, the average period from the time of injection to death was 15.6 days; shortest period 8 days; longest period 24 days. The actual period of incubation would necessarily be a trifle less. Arms[5], from a large number of guinea pigs kept under observation, estimates that 1.69 days longer is

required for death to take place following the appearance of the earliest symptoms, which would place the average period of incubation at a trifle less than 14 days for guinea pigs.

MICROSCOPIC EXAMINATION.—The distinct changes in the cellular structure of the cerebral hemispheres, cerebellum, spinal cord and nerve ganglion accompanying the development of rabies were pointed out in the early seventies, but Babes in 1892 was the first to search for these tissue changes in animals dead of rabies to assist in the establishment of a diagnosis. He held

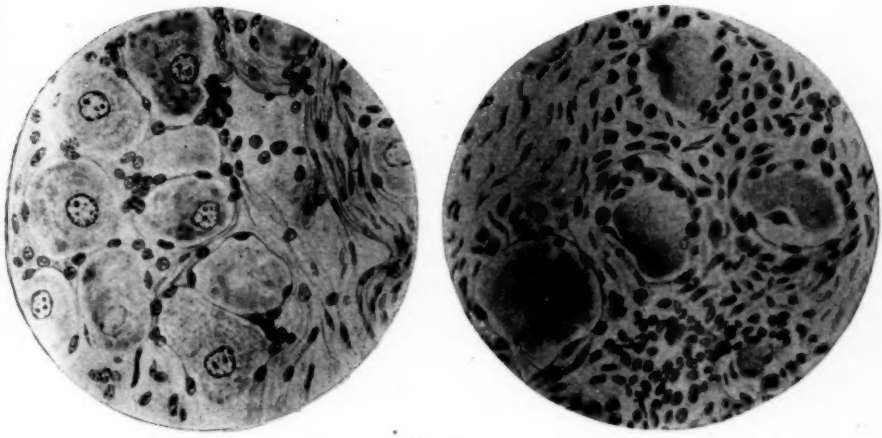

FIG. III.

Section of Plexiform Ganglion of a Normal Dog. Section of Plexiform Ganglion of a Dog with Rabies.

that it was possible to make a rapid diagnosis by a microscopic examination of the medulla oblongata and spinal cord, describing the cellular accumulation in these structures under the name of "rabic tubercle." Following the discovery of the "rabic tubercle" by Babes, Nelis in the laboratory of Van Gehuchten, found changes in the spinal cord and ganglion of two human beings dead of rabies. Ravenel and McCarthy[6] emphasized the diagnostic importance of these tissue changes in 1900, and expressed themselves of the opinion that the examination of the ganglion in the dog for the changes described by Van Gehuchten and Nelis afforded an accurate means to a rapid diagnosis of rabies. These changes pointed out by Van Gehuchten and Nelis

in the ganglion and those of Babes in the medulla oblongata and spinal cord are the result of the influence of something thrown off by the cause or virus of rabies upon the endothelial cells and nerve cells, directly or indirectly. The endothelial cells forming the walls of the capillaries and the single layer of the endothelial cells which make up the lymph sacs surrounding the larger nerve cells of the spinal cord and those of the nerve ganglion are chiefly involved. These cells are apparently stimulated to proliferate and the increase in the cells causes a thickening of the walls of the capillaries and lymph sacs. Along with these endothelial changes, slightly in advance, the nerve cells undergo degenerative changes—shrinkage, chromatolyses and as the endothelial cells crowd in upon and over the nerve cell, complete destruction of the nerve cell is the result (see Plate III.). Crocq followed by Spiller[7] was among the first to show that endothelial cell proliferation with nerve cell degeneration and destruction is seen in some conditions, without the existence of rabies. This has been the experience of others and the writer in the study of forage poisoning or cerebro-spinal meningitis of horses has seen typical "rabic tubercles" in the medulla oblongata, and in several dogs with distemper, endothelial cell proliferation changes were found in the ganglion.

In 1905 to 1909 inclusive, sections of the medulla oblongata and ganglion, including one of the sympathetic ganglion and plexiform ganglion of the pneumogastric nerves were examined for proliferation changes with the following results:

	251 Positive Cases.	86 Negative Cases.
Medulla Oblongata 337 (Babes Proliferation Changes)	180 (71.7%)+*	80 (93.0%)—
	69 (27.5%)—	5 (5.8%)+
	2 (0.8%)S	1 (1.1%)S
	171 Positive Cases.	71 Negative Cases.
Sympathetic Ganglion 242 (Van Gehuchten and Nelis Proliferation Changes)	139 (77.6%)+	66 (92.9%)—
	30 (16.0%)—	3 (4.2%)+
	2 (5.8%)S	2 (1.1%)S
	360 Positive Cases.	108 Negative Cases.
Plexiform Ganglion 468.....	357 (99.1%)+	71 (65.7%)—
	0 (0 %)—	14 (12.9%)+
	3 (0.8%)S	23 (21.2%)S

* + = Positive; — = Negative; S = Suspicious.

Babes " rabic tubercle " were not seen in 27.5 per cent. of the sections of the medulla oblongata examined from animals with rabies and in 5.8 per cent. " rabic tubercles " were demonstrated in the medulla oblongata of dogs proven to have been free of rabies. The changes of Van Gehuchten and Nelis in the sympathetic ganglion were seen in 77.6 per cent. of the actual cases of rabies, and in 4.2 per cent. of the ganglion of animals free of rabies. The changes in the plexiform ganglion of the positive cases were found in 99.1 per cent., and in not a single instance of all the cases considered rabid did these ganglionic changes fail to show themselves. That similar changes are seen in the plexiform ganglion of animals not rabid is shown in that in

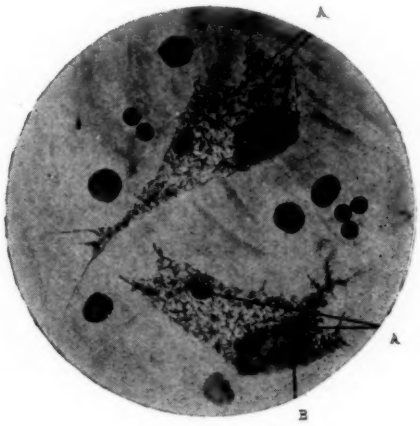

Fig. IV. Two nerve cells of Hippocampus Major (smear preparation) showing Negri Bodies. A—Negri Bodies. B —Inner Bodies with the Negri Bodies.

12.9 per cent. of the negative cases similar changes were found. The changes in the plexiform ganglion are better developed the longer the animal is permitted to live after symptoms of rabies develop.

NEGRI BODIES.—The bodies demonstrated by Prof. Adelchi Negri of Pavia University in 1903 in the nerve cells of the brain and spinal cord of animals dead of rabies and known as Negri bodies, are now held of the highest value in the diagnosis

of rabies, and are looked upon by many as the probable cause of rabies. They have as yet not been demonstrated in any other disease. Bodies such as vacuoles and granules are seen in the nerve cells of the normal animal or in those dead from one cause or another, but these cell inclusions cannot be mistaken for the Negri bodies which have definite morphological characteristics. They are oval or rounded in form and in size vary from exceedingly minute to the largest approaching 25 microns in diameter or length (see Plate IV). Those usually seen in the brain of the dog of the street vary in size from barely visible forms to fifteen microns in diameter, rarely more. The smallest forms are seen in rabbits dead from an injection of "fixed virus," and most extraordinarily large forms are seen in the cow dead of rabies. Negri bodies have distinct staining affinities as they favor the basic stains over the acid. Within the body, small, usually rounded but frequently irregularly shaped inner bodies are seen that favor most all of the chromatin stains, characteristic of nuclear material. With the stains now in general use, these inner bodies take a blue to a black color, the intensity varying with their size. The smaller the inner bodies, the deeper the stain, while the rest of the body takes a light stain, a purple to a pink, or various shades of red. The contrast is at once striking, and these inner bodies encourage attention. The inner bodies may be seen as a single body, which is true of those tiny forms seen in the rabbit, and around these tiny forms, other granular material can be seen. The next larger forms show no appreciable enlargement of the inner body. Usually in the Negri body showing considerable granular material around the inner body, the inner body is apt to be noticeably larger and not stained as deeply as the inner body of the tiny forms. Then, too, in the larger forms, not infrequently several inner bodies are seen lying close to one another, but each small and deeply stained. Forms showing larger inner bodies not so deeply stained are seen, and in addition several smaller deeper stained inner bodies may either lie close to the larger inner body or out in the structure around the inner body. Another form of

much interest is the one in which the inner bodies are scattered through the Negri body, all fairly deeply stained. Not infrequently a form in which these separate inner bodies stain rather deeply scattered through the body, stand out prominently appearing to be pushing out the outline of the Negri body, strongly suggesting pseudopods or budding forms. Of the protozoa, the ameba or rhizapods and sporozoa, exceedingly varied and complicated life cycles are recognized. In one stage of the development of these protozoa, additional chromatin material makes its appearance within the cellular structure, either by a reduction of the chromatin of the nucleus or by the elaboration of chromatin by the cytoplasm, the result of some special stimulus affecting the nucleus or cell protoplasm. The chromatin bodies are distributed through the cytoplasm, and these chromidial forms form a distinct phase in the development of these protozoa. The inner bodies of the Negri bodies, as chromatin or nuclear material, occasionally show an arrangement or stage resembling this chromidial stage of the rhizapods and sporozoa. The position taken by Williams and Lowden[8] in considering the Negri bodies as protozoa and by Calkins[9] that they are one of the ameba or rhizapods is well founded, on the study of the various forms of the bodies met with. The protozoon nature of the cause of rabies receives additional support in that quinine will neutralize the virus in test tubes.

That Negri bodies are closely associated with the cause of rabies has been proven by the uniformity with which it is possible to reproduce the disease with material in which the bodies are demonstrated. They have been found in the larger nerve cells of the brain, in the cerebellum, hippocampus major, medulla oblongata and cerebral cortex. They have never been demonstrated in the nerve trunks, but they have been seen in the nerve cells of both the plexiform ganglion and the ganglion closely associated with it—the sympathetic ganglion. Attempts to demonstrate Negri bodies in the saliva or salivary glands or the milk or the mammary glands, lachrymal secretion or lachrymal gland, supra-renal gland and pancreatic secretion or pan-

creas, has never been successful, nor have Negri bodies been found in the blood or any of the tissues of the body excepting those named of the nervous system. It will be extremely difficult to satisfactorily explain, when Negri bodies are accepted as protozoa and the cause of rabies, why it is that these bodies cannot be demonstrated in the saliva or salivary glands or other body secretions or glands which are known to contain the virus, but some light may be thrown upon this puzzling fact when it is remembered that the life cycle of many of the known rhizapods or sporozoa is extremely complicated and spore forms or sporozoits exceedingly small are formed, some of which may be of invisible size. It is therefore reasonable to conclude that similar small sporozoit formation may be a part of the life cycle of the Negri body protozoon, and that it is the small sporozoits in the saliva and other secretions which have as yet not been demonstrated. Negri bodies were first demonstrated in sections of the brain tissue and many different stains are in use. They are readily demonstrated in sections stained with hæmatoxylin and eosin, but there are other stains which may be used to advantage to bring out the inner structure more clearly. In 1904 it was suggested to Williams[10] that it might be possible to demonstrate Negri bodies in smears of the brain tissue, which was tried and found to be a highly satisfactory and quick method to demonstrate the bodies. The smears are made by spreading over a slide, a small piece of brain tissue in which the Negri bodies are most frequently found. The tissue is placed upon a slide near one end and is covered with a cover slip. Pressure is then applied upon the cover slip and the brain tissue flattened out and spread toward the other end of the slide. The smears before they are given an opportunity to dry are placed in absolute methyl alcohol, one to three minutes, which, in dehydrating the tissue, firmly fixes the smear upon the slide. The methods of staining these smears are numerous and most all of them good, providing they bring out the inner bodies and stain the structure surrounding these inner bodies of a different shade or color, than the nerve cell in which they are found. In the laboratory

of the Pennsylvania State Livestock Sanitary Board, the following procedure in the demonstration of the Negri bodies has been closely adhered to during the past four years: As soon as the animal's head arrives at the laboratory, the entire brain and the plexiform ganglion, with its closely associated sympathetic ganglion are removed (see Plates I. and II). A portion of the cerebellum is placed in sterile glycerin, in which the brain tissue may be preserved and retain the virus for many weeks. These glycerin immersed specimens are only referred to for the animal inoculation test when the microscopic examination is unsatisfactory. Aside from preventing decomposition, the glycerin will also destroy bacteria and check decomposition of the specimen. From the fresh brain tissue, smears are usually made from the hippocampus major and cerebellum (see Plate II.). A piece 1 mm. thick and several mm. in diameter cut from the fresh surface exposed, after an incision is made through the hippocampus major at right angles to its length, or of the cerebellum in which an incision has been made at right angles to the convolusions, is placed upon a slide near one end. Instead of using a cover slip, another slide is placed over the small piece of tissue and gentle pressure is applied and the opposite ends of the slides are moved toward one another. The smears are then placed in absolute alcohol for two to five minutes, whereupon the alcohol is allowed to evaporate and the smears then stained. The stain as recommended by Van Gieson is used.*

Loeffler's alkalin methylene blue..... 1 part
Distilled water..... 1 part
Saturated alcoholic solution of fuchsin added in drops until the mixture has a purple tinge, or until a metallic scum is seen on the surface.

* Dr. John H. Engel, first assistant in the laboratory, who has been entrusted with the examination of the smears during the past two years finds the following formula of the above mixture a satisfactory stain for the average specimen:

Loeffler's alkalin methylene blue	5 c. c.
Distilled water	20 c. c.
Saturated alcoholic solution of fuchsin	4 drops.

The mixture kept at a low temperature can be used for an unlimited length of time, but is apt to change quickly at room temperature, and for this reason a new batch of stain is usually made each day, or as each specimen is prepared for examination. A smear properly fixed upon a slide is taken up with a pair of forceps and completely covered with stain. The slide is passed through the flame of a Bunsen burner several times until steam arises from the heated stain, which is permitted to remain upon the smear for five to thirty seconds. The smear is then washed in running water, and if the color of the smear is blue where the brain tissue is most thick, and red where the smear is thin, the slide is placed between filter paper and dried. As soon as the slide is dry a search is made for large nerve cells with a low power lens under the microscope. The protoplasm of the nerve cells should be stained a light blue, the nucleus a shade of purple and the nucleolus a dark blue. If the cells are stained too deeply the stain may be weakened by the addition of more distilled water or in heating the staining fluid on a smear for a longer time, the intensity of the staining of the fuchsin will be increased at the expense of the blue of the Loeffler's alkalin methylene blue. When a nerve cell is found properly stained, it is examined with an oil immersion lens. Negri bodies with this staining fluid show the inner bodies a bluish black, and the structures around the inner bodies a maroon red. They are found within the cell, outside of the nucleus of the cytoplasm in the nerve cells of sections, but not infrequently in smear preparations, a few Negri bodies not within the nerve cells are seen which have been forced out of the nerve cell as the smear is made. In searching a smear for Negri bodies, only those bodies within the nerve cells should be considered.

Frothingham[11] in 1906 demonstrated his impression preparations which he uses in preference to smears. Impressions of the tissue under examination are made by pressing a slide over a fresh cut surface, usually of the hippocampus major or cerebellum. The section of the tissue, hippocampus major or cerebellum, is flattened out with a slide under pressure. The slide

raised from the tissue will show a film on the slide which was in contact with the tissue, and this film may be fixed and stained as are smears. In the film, the outline of the nerve cells and cellular structure taken up, is little disturbed. In the impressions, the Negri bodies are not so apt to be misplaced or rubbed out of the nerve cell as they are in the smear preparations. The stain for Negri bodies used by Harris[12] has been tried and found to take up more time in its application than the Van Gieson stain, but at the same time the inner structure and the differential stain are well brought out and the stain is recommended in the examination of specimens in which the Negri bodies are very small in size, or in exceedngly small numbers. With good material, Negri bodies may easily be demonstrated by either smears or impressions in several minutes. Fresh material is considered better than decomposed, but in our experience Negri bodies are more easily demonstrated in brain tissue from an animal dead 24 to 48 hours than in tissue examined within a short time after death. The changes that take place in the 24-48 hours after death appear to prepare the tissue so that Negri bodies stand out more clearly, and smears and impressions show clearer nerve cells. Decomposition does not interfere very much in the examination until the outline of the nerve cells is destroyed. Even when nerve cells are no longer seen Negri bodies may be found, but it is not safe to venture a diagnosis on these extracellular bodies alone. Although it is believed that Negri bodies can be demonstrated in from 97 to 99 per cent. of animals afflicted with rabies that have been permitted to die a natural death, the results of the examination of the hippocampus major and cerebellum, by means of smear preparations, as shown in the following figures do not show this to be so:

	393 Positive Cases.	146 Negative Cases.
Hippocampus major 539 (Smears for Negri bodies)	349 (86.3%)+	143 (97.9%)—
	37 (9.6%)—	0 (0.0%)+
	7 (1.7%)S	3 (2.0%)S
	341 Positive Cases.	145 Negative Cases.
Cerebellum (Smears for Negri bodies)	301 (88.2%)+	141 (97.5%)—
	33 (9.6%)—	0 (0.0%)+
	7 (2.0%)S	4 (2.7%)S

+ = Positive; — = Negative; S = Suspicious.

The high percentage, 9.6 per cent., of failures to demonstrate Negri bodies in positive cases is unusual, is perhaps partially explained in that many of the specimens examined were from animals killed early in the onset of symptoms of the disease, and the specimens in all stages of decomposition. Our greatest difficulty in demonstrating Negri bodies in the smears is experienced with the specimens from the larger animals, particularly the horse. The brain of the horse seemingly contains a substance which interferes with the proper staining of the smears and impressions. Then, too, the distribution of the bodies in the brain of the horse is not uniform; they are apt to be localized and this fact also accounts for the high percentage of failures to demonstrate Negri bodies. The same difficulty in the staining of smears or sections and the tendency for the bodies to localize is met with in the hog and deer, to a less extent in man, and only occasionally in cattle.

In 127 instances in which animal inoculation tests were made following the examination of the brain tissue for Negri bodies, in not one of the 61 in which Negri bodies were demonstrated in the material inoculated did the rabbits fail to develop rabies. In 66 in which Negri bodies were not found in the material inoculated, the animal inoculation test was negative in 52; in 14 the animal inoculation tests proved that rabies existed. Negri bodies during 1906 and 1909 inclusive have been sought for in 728 cases and found in 512, and in 216 no Negri bodies were found.

Rules Regulating the Examination and Diagnosis.—Negri bodies and the Van Gehuchten-Nelis changes make their appearance in the nervous system a short time before the animal shows symptoms. The virus, however, may be present in the saliva and the animal capable of transmitting the disease several days before symptoms are observed. From the routine examination of specimens, it is seen that Negri bodies are most abundant and the Van Gehuchten-Nelis changes most marked in dogs that have died a natural death. In those animals destroyed early in the course of the disease, it is difficult and at times im-

possible to demonstrate Negri bodies or Van Gehuchten-Nelis changes, although rabies exists. Therefore, the rules regulating the examination and diagnosis largely depend upon the manner in which the animal met its death. It is always desirable to have this information with the specimen.

Specimens from animals that have died a natural death, those who destroyed, are examined and the diagnosis is made as follows:

1. Smears are made and examined for Negri bodies, and as soon as the bodies are found the examination is discontinued and a diagnosis of rabies is made. 2. When Negri bodies are not found in the smears, sections of those structures already examined by the smear method are examined, and if Negri bodies are found the examination is discontinued and a diagnosis of rabies is made. 3. When Negri bodies are not demonstrated, the plexiform ganglion are examined for the Van Gehuchten-Nelis changes, and if absent a negative diagnosis is made. 4. Where Negri bodies are not demonstrated and well marked characteristic Van Gehuchten-Nelis changes are found, a diagnosis of rabies is made and the animal inoculation test is carried out to verify the diagnosis. 5. Where Negri bodies are not demonstrated and slight proliferation changes are seen in the plexiform ganglion, it is reported that the microscopic examination is negative, and that the diagnosis must rest upon the result of the animal inoculation test.

Specimens from animals destroyed shortly after the first symptoms are noted and suspected of having rabies, the examination and diagnosis is made as follows:

1. Smears are made and examined for Negri bodies, and as soon as the bodies are found, the examination is discontinued and a diagnosis of rabies is made. 2. When Negri bodies are not found in the smears, sections of those structures are examined by the smear method, and if Negri bodies are found, the examination is discontinued and a diagnosis of rabies is made. 3. In those cases where the brain tissue is entirely destroyed and only the ganglia are obtained, the presence of well marked character-

istic Van Gehuchten-Nelis changes in the plexiform ganglion is considered sufficient to base a diagnosis of rabies upon. 4. Where Negri bodies are not demonstrated and well marked, Van Gehuchten-Nelis changes are found, a diagnosis of rabies is made and the animal inoculation test is carried out to verify the diagnosis. 5. Where Negri bodies are not demonstrated and no proliferation changes are seen in the plexiform ganglion, it is reported that the microscopic examination is negative and that the diagnosis must rest upon the result of the animal inoculation test.

As soon as the result of the animal inoculation test is obtained, it is reported. All experimental animals are kept for a period of 100 days, and if at the end of that time they show no symptoms, the animal inoculation test is considered negative.

In the routine examination of the specimens suspected of rabies in the laboratory of the Pennsylvania State Livestock Sanitary Board during 1905-1906 inclusive, 914 were included, as shown in Table No. II., the animal inoculation test was resorted to in 198 cases, 87 of which proved positive and 111 negative.

TABLE NO. II.

Specimens Examined and Diagnosis 1905-1909, *Inclusive.*

	1905.	1906.	1907.	1908.	1909.	Total of Species.	Diagnosis.
Dog	67+	76+	73+	90+	189+	495+	78.1%+
	11—	9—	15—	29—	51—	115—	18.1%—
	1S	1S	1S	..	2S	5S	0.8%S
	..	1D	3D	13D	2D	19D	3.0%D
Cow	1+	1+	10+	7+	15+	34+	68.0%+
	1—	..	5—	4—	3—	13—	26.0%—
	2S	..	..	..	..	2S	4.0%S
	..	..	..	1D	..	1D	2.0%D
Horse	1+	2+	..	2+	6+	11+	44.0%+
	1—	5—	..	3—	4—	13—	52.0%—
	..	..	..	1D	..	1D	4.0%D
Mule	..	..	2+	..	..	2+	.....
Cat	2+	1+	..	..	3+	6+	.....
	1—	..	..	1—	2—	4—	.....
Sheep	..	..	..	1+	1+	2+	.....
	..	..	..	..	1—	1—	.....

		1905.	1906.	1907.	1908.	1909.	Total of Species.	Diagnosis.
Hog		..	..	..	..	1+	1+	.....
Deer		..	..	..	2+	..	2+	.....
Man		1—	1—	..	..	3+	3+	.....
		..	..	..	..	..	2—	.....
Rabbits		1+	26+	12+	13+	42+	94+	.....
		1—	7—	14—	9—	23—	54—	.....
		..	1S	..	..	1S	2S	.....
Guinea Pig..		..	11+	11+	..	1+	23+	.....
		..	2—	5—	..	1—	8—	.....
Total		72+	117+	108+	115+	261+	673+	.....
		16—	24—	39—	46—	85—	210—	.....
		3S	2S	1S	..	3S	9S	.....
		..	1D	3D	15D	2D	21D	.....
Percentage ..		79.1%+	81.3%+	71.5%+	65.4%+	74.5%+	73.7%+	.....
		17.6%—	16.6%—	25.8%—	26.1%—	24.2%—	23.0%—	.....
		3.3%S	1.4%S	0.7%S	.....	0.8%S	1.0%S	.....
		.....	0.7%D	2.0%D	8.5%D	0.5%D	2.3%D	.....

+ = Positive; — = Negative; D = Decomposed; S = Suspicious.

Specimens from a fairly large variety of animals have been examined and attention is called to the fact that Negri bodies were demonstrated in each of the species, including three human beings. The rabbits and guinea pigs tabulated are some of the experimental animals in which it was necessary to examine the brain tissue for Negri bodies. The brains of all the rabbits and guinea pigs that died within the usual period of incubation, were examined and the diagnosis was made on the Negri bodies in each instance. 73.9 per cent. of all the specimens examined were found positive, 22.9 per cent. negative, 0.9 per cent. remained suspicious and 2.9 per cent. were too far decomposed for examination. The percentage of positive cases may be somewhat higher than is the experience of other laboratories, which must be attributed to purely local conditions.

In Pennsylvania, the State Livestock Sanitary Board prefers the confirmation by a laboratory examination of all epizootics as they arise in a new locality and not infrequently a rapid succession of positive cases, makes their appearance in the laboratory.

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ILLEGAL VETERINARY PRACTITIONER FINED.—R. J. Johnson, of Big Lake, was fined $50 before the Municipal Court on account of practicing veterinary medicine in the state without a license. Mr. Johnson pleaded guilty on the charge when arraigned. The prosecution was pushed by Dr. C. A. Mack, Secretary of the State Veterinary Examining Board. Mr. A. J. Tupa, Assistant Secretary to the Board has been doing some active detective work in obtaining cases of illegal veterinary practice. In the criminal complaint made, it was shown that the illegal practitioner, Mr. Johnson, treated a horse for Mr. Tupa for what he called kidney trouble. His lack of knowledge of veterinary practice was brought out by the fact that he diagnosed the case as kidney trouble, when, in fact, the horse was perfectly sound.

FORAGE POISONING OR CRYPTOGAMIC POISONING; ALSO CALLED ENZOOTIC CEREBRITIS, EPIZOOTIC CEREBRO-SPINAL MENINGITIS, LEUCO-ENCEPHALITIS, ETC.

By C. H. Stange, Ames, Iowa.

Numerous cases have been reported of an affection of the central nervous system, the symptoms being in general quite similar but different and varying causes are assigned. Dr. Francis reports that in the fall of 1903 and spring of 1904 four to five thousand horses and mules died with a nervous disorder characterized by structural changes in the brain which caused incoordination, delirium, coma and usually death. He concludes that the disease is not caused by molds, but is the result of animals having free access to a labor diet when kept in idleness. He was unable to find the germ described by Wilson and Brimball.

Professor Harrison of the Ontario Agricultural College reported several cases, and as a result of his investigations he concluded that the disease was due to a coccus isolated from the meningeal fluids. Pearson studied an outbreak in seven horses, five of which died. The outbreak occurred soon after opening a new silo, the ensilage from which was moldy. The symptoms observed were very similar to those observed by Professor Harrison and he emphasized the paralysis of the pharynx and great muscular weakness. He concluded as a result of feeding experiments that the so-called cerebro-spinal meningitis was a forage poisoning. Dr. Dow, of Connecticut, describes two cases which were attributed to watering from a tub containing a moldy slime. Dr. Ferguson, of Texas, describes three cases of forage poisoning due to smutted corn. There was vertigo, coma, low temperature, pulse in later stages rapid and irregular. In 1901

Dr. Hickman investigated an outbreak among horses in North Carolina in which a large number of horses died. In 1906 another outbreak occurred at the same place (Hyde Co.) in which about forty horses and mules died in about three weeks. The cause in these cases seemed to be molds on vegetation. On the whole the country is low and swampy. The pathological changes of epizootic leuco-encephalitis were described by McCallum and Buckley in 1902. Muller, of Germany, reported an outbreak among horses, cattle and sheep due to moldy straw. (*Berliner-Tierärztliche Wochenschrift.*) Drs. McCarrol and McMullen describe an outbreak of cryptogamic poisoning in horses due to feeding moldy beet tops. Dr. Lockhart described several cases in Canada. The prominent symptom seemed to be the inability to swallow.

Two outbreaks have come under our observation during the past year. The first consisted of eleven head of horses, two were being fed for market, the others were fed in the same manner during the night and turned out during the day. The first animal affected was one being fed for market. It ate part of its feed in the morning but in a few hours symptoms of ptyalism appeared, accompanied by depression and paresis of the hind quarters. By noon the animal was down, unable to rise and struggling some, and died that night. The next animal to show symptoms was its mate. The symptoms shown in this case were similar to acute cases of the so-called cerebro-spinal meningitis, coming on with trembling and weakness causing the animal to stagger. The animal became quite violent at times and finally died, living but a few hours longer than the first. The other seven animals showed a more chronic course, accompanied by inability to swallow, slow weak pulse, difficult, noisy respiration, weakness and paralysis, spasms of muscles of head, neck and back, death taking place in from two to six days. The remaining two animals showed a mild type of the disease as slight loss of control, some exophthalmia, loss of appetite and thirst and loss of condition. These animals were placed on potassium iodide and nux vomica and recovered. An early symptom in

all cases coming under our observation is the ptyalism due to inability to swallow. (Dysphagia.) As a result the saliva collects in the mouth and hangs from it in strings. Muscles of different regions of the body are liable to contract. The breathing was rapid and in some cases of the Cheyne-Stokes variety. The temperature in most cases was sub-normal. In some of the more chronic cases and when the animal had been down for some time with considerable struggling, the temperature was somewhat elevated. The pulse was variable, being about normal in some cases and rapid and almost imperceptible in others.

This outbreak was attributed to moldy silage, which was being fed to the horses, but in order to be more certain 150 pounds of silage were shipped to the College. A sample was submitted to Dr. R. E. Buchanan for examination. In addition two horses were fed this silage to further establish the relationship between it and the cause of death of the nine head of horses. The first horse died in two days from an acute form of the disease. The other horse would not eat the silage readily, consequently lived about two days longer. In both cases the symptoms resembled those seen in the original outbreak. Post mortem revealed no changes except a few petechia along the small intestine, a few infarcts in the kidney and slight softening of the brain. This, however, was not very marked, probably due to the fact that they were acute cases. Microscopic examination revealed the presence of mold in the mucosa and submucosa of the small intestine, also mycelial threads growing between and around the renal tubules.

We suspect that a mold was responsible for the death of these animals, and the following work by Dr. Buchanan is of especial interest in this connection.

Monascus Purpureus in Silage.*

During the year 1909, the writer had frequent occasion to examine the molds which are common in silage not properly pre-

* R. E. Buchanan (with plates 22 and 23, containing 31 figures). Reprinted for Mycologia, Vol. II., No. 3, May, 1910.

pared or cared for. Such moldy silage has in several instances caused the death of farm animals, particularly horses; the symptoms of the disease being those of "forage poisoning" or "equine cerebro-spinal meningitis." Numerous cultures have been made and many molds isolated from different silages, among them several species of *Penicillium, Aspergillus, Mucor,* the mycelium of a hymenomycete (probably a *Coprinus*), and, in one instance, *Monascus.* The last mentioned was practically the only mold found in one sample. Inasmuch as no record has been found of its occurrence in America and no record of its occurrence in silage, a brief account of the fungus is here given with notes on its morphology and cultural characters.

In March, 1909, a moldy sample of silage was brought to the laboratory by a veterinarian. It was part of the contents of a silo and had been the apparent cause of the death of nine horses that had been fed upon it. Experimental evidence was brought forward later by Dean Stange, of the Department of Veterinary Medicine at the Iowa State College, which demonstrated the causal relationship of this silage to the disease. An examination of the material showed it to be thoroughly infected and matted with the mycelium of *Monascus.* Although no experimental evidence of any direct relationship between this particular organism and the death of the horses has been shown, the fungus has been thought worthy of study and record on its own account.

Gross Characters of the Mold.

It is generally known that silage insufficiently packed or too dry when cut is much more apt to mold than that which is moist and well compacted. The material brought to the laboratory was much drier than usual, and matted together by mold into large masses which offered considerable resistance to being torn apart. Examination showed all parts of the silage, leaves, stalks, and ears, to be covered with a white layer of mold, forming cottony masses in some of the spaces. Where it occurred on the kernels of corn, particularly where they had been broken or

crushed and the starchy endosperm exposed, the mold often assumed a pink to carmine-red color.

Isolation and Cultural Characters.

Silage Agar.—Five hundred grammes of fresh silage was boiled for thirty minutes in one liter of tap water. This was then filtered and the silage on the filter washed with hot tap

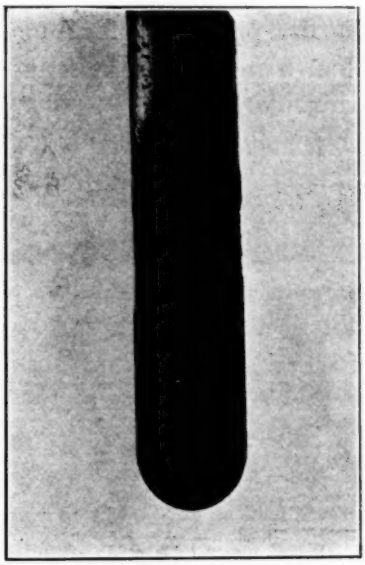

FIG. 1. Colonies of *Monascus purpureus* two weeks old in silage agar.

water until a liter of the decoction was secured. This was autoclaved with one and one-half per cent. agar agar threads, filtered, tubed and sterilized. Dilutions were prepared from the silage mold at points where conidia were found most abundant. These conidia germinated within twenty-four hours in most instances. The mold colonies in the lower dilutions did not develop very far on account of the luxuriance of bacterial growth. In the other plates, however, the bacterial colonies were scattered so that they did not interfere with the normal development of the

mold. The inhibition of mold growth in the presence of large numbers of bacteria is a possible explanation of the fact that moist silage decays without becoming moldy through the activity of bacteria, while silage somewhat drier becomes covered with molds. Within the course of a week these mold colonies were from one half to one and a half centimeters in diameter. The outlines of the colonies are very indefinite, for the organism grows almost entirely within the substratum, forming there conidia and perithecia near the center of the colony. However, aerial hyphae are usually produced, forming a cottony surface growth not more than a millimeter in height. Within a few days, the colony, particularly near the center, becomes tinged with red and in two or three weeks is a deep carmine. This coloring gradually extends throughout the colony, always being deepest near the center.

Silage Broth.—A decoction of silage was prepared as outlined in the preceding paragraph, and used without further additions in 50 c. c. lots. The organism grows rather slowly in this medium, forming spherical cottony masses of hyphae not easily broken up by shaking. In one to two weeks the hyphae reached the surface of the medium (a distance of about 2 cm.) and two weeks later the surface growth attained a diameter of from 1-4 cm. This surface growth develops large numbers of aerial hyphae, not extending more than one millimeter above the surface. There is a red pigment produced in some cases, but most cultures remain perfectly white (Fig. 2).

Glycerin Solutions.—Harz (1890) described *Physomyces heterosporus* from the surface of glycerin vats in a soap factory. Here, as well as in the laboratory, it grew on solutions containing as much as 30 per cent. of glycerin. To determine the ability of the organism in question to use glycerin, flasks containing 100 c. c. of 5, 10, 20 and 40 per cent. glycerin in tap water were inoculated with pure cultures of *Monascus*. Growth occurred in the 5 and 10 per cent. solutions, but little or none in the 20 and 40 per cent. solutions. In the 5 per cent. solution small masses of mycelium could be observed within a few days,

floating in the liquid. These continued to enlarge slowly for two months, at the end of which time they formed a semi-transparent mass of a quarter of the volume of the medium. The interior of such masses was found to be densely matted, and of a deep carmine color. In a 10 per cent. solution of glycerin growth was slower, the colonies or mycelial balls remaining smaller and more compacted.

Rice Flour.—A thick paste of rice flour in tap water was prepared and sterilized in test tubes. Growth on this medium

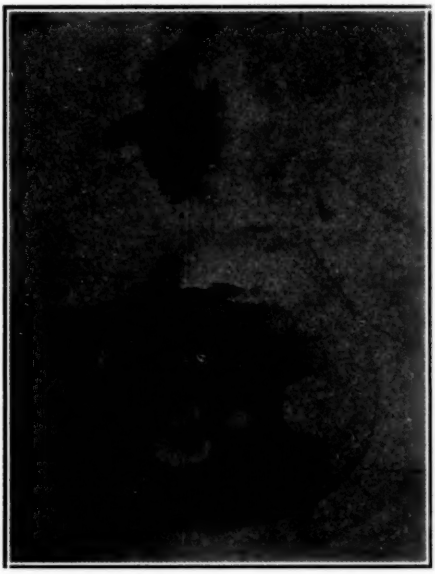

FIG. 2. Colonies of *Monascus purpureus* one month old in silage decoction.

was more luxuriant than on any other tried. Within two days after inoculation, mold patches could be observed, as delicate white colonies arising from the surface of a carmine-red medium. The mycelium completely covered the surface within a few days and the medium changed to an orange-red. The surface of a culture a month old is somewhat wrinkled, the fungus forming a gray felt, with the medium itself entirely red.

Morphology.

The hyphae of the organism vary from 2 to 5 microns in diameter, branching abundantly and rather irregularly. When within the medium or just at its surface, branching is much more abundant than in the aerial hypae. Under certain conditions, as between broken corn kernels, the hyphae may lie tightly packed side by side (*pl. 22, f. 6*) with little or no branching evident. The mycelium does not produce differentiated vegetative hyphae and conidiophores. The conidia may appear terminal on almost any branch. The hyphae are septate, the cell contents usually granular, and the older cells are vacuolate and contain oil drops.

Barker (1903) has noted the frequent occurrence of swellings on the hyphae of *Monascus,* particularly when the concentration of the solution had increased by evaporation, as in an old hanging drop. That this is not the only cause of such swellings is evident from pl. 22, f. 1, which shows their presence on aerial hyphae. They were also found abundantly in the 5 and 10 per cent. glycerin cultures. In size and shape these swellings approach the conidia. On starchy media, and in some others, the red coloring matter is to be found irregularly distributed through the older threads.

Conidia.—The conidia are borne singly or produced in basipetal chains of 2-6 or more. They may be found on aerial hypae or imbedded in agar or immersed in a nutrient solution. They may even be abstracted by the tips of the filaments which invest the perithecium. No evidence of the formation of micro- and macro-conidia could be discovered, although considerable variation in size was noted, from 6 to 10 by 7 to 15 microns. The conidia are sometimes tinged with red in old cultures; usually, however, they are colorless (*pl. 22, f. 2, 3*). Germination occurs under suitable conditions within a few hours (*pl. 22, f. 5*).

Ascocarp or "Perithecium."—The fruiting body of *Monascus* (or *Physomyces*) was first described by Harz (1890) as a sporangium or sporocarp. More recent writers, as Barker (1903) and Olive (1905), have shown it to be of an ascomycet-

ous type, although this claim has been denied by Ikeno (1903). All are agreed, however, that it is produced as the result of a true sexual fusion. Observations of the form in question seem to indicate that the interpretation given by Olive (1905) is the correct one. Serial sections have not been prepared, however, and the exact sequence of events cannot be accurately determined without a careful study of the subject. The perithecia develop in great numbers upon the hyphae and are generally terminal, though sometimes apparently lateral (*pl.* 23, *f.* 8). The young perithecia may be found in suitable media within two or three days after sowing the conidia. They develop not only an aerial hyphae, but also in the body of a medium such as agar, and nowhere were they found more abundant than in 5 and 10 per cent. glycerin solutions. So marked is this ability to produce perithecia and conidia under water, that the organism might well be classed as one of the aquatic molds. An antheridial cell fuses with a functioning egg cell, and, within this, are developed the ascogenous hyphae which ultimately form one to many asci, each typically with eight ascospores. The steps in this process can be seen only with difficulty, for the "central cell" soon becomes closely invested by sterile hyphae which branch and apparently anastomose about it.

Various steps in the development of these hyphae may be seen in the figures (*pl.* 23, f. 4-10). Sometimes branches may extend out from this investing mass (*pl.* 23, *f.* 10) and even produce conidia. These hyphae soon lose their contents and collapse, forming a thin membrane at maturity, which sometimes shows little evidence of its origin. Pl. 23, f. 11 shows a perithecium nearly mature, with the ascospores grouped within the asci. The walls of the latter soon disintegrate and the ripe perithecium filled with loose spores resembles the sporangium of a phycomycete. These perithecia vary from 25 to 50 microns in diameter. They are usually terminal at the end of a long hypha, but in some media there may be noted variations in the length of this pedicle. The spores within the perithecium number from 6 or 8 to several hundred. They are nearly spherical in shape and from

3.5 to 6 microns in diameter. They are usually tinged with brown or are slightly fuscous when mature.

Specific Position of Silage Monascus.

There have been described in literature five species of *Monascus*. *M. heterosporus* Schröter (*Physomyces heterosporus* Harz) differs from the form in question in having two types of conidia, having smaller conidia, and developing in much more concentrated solutions of glycerin. *M. ruber* van Tieghem differs in having larger conidia and spores and a red perithecium. *M. mucoroides* van Tieghem has larger perithecia, spores and conidia. *M. purpureus* Went agrees in all essential characters, and this organism is placed here tentatively. *M. purpureus* is the characteristic mold used by the peoples of eastern Asia in the preparation of "red rice" (Ang-quac). The fact that rice covered with this mold is used by the Chinese as food rather militates against the possibility of the form in silage being poisonous. This has not, as before stated, been investigated as yet, and further study may cause a change of view as to its specific position.

Summary.

A mold answering to the description of *M. purpureus* Went was found to be the typical fungus present in a moldy silage which killed eleven horses. The pathogenic properties of the organism have not as yet been wholly determined. This appears to be the first record of the occurrence of *Monascus* in this country.

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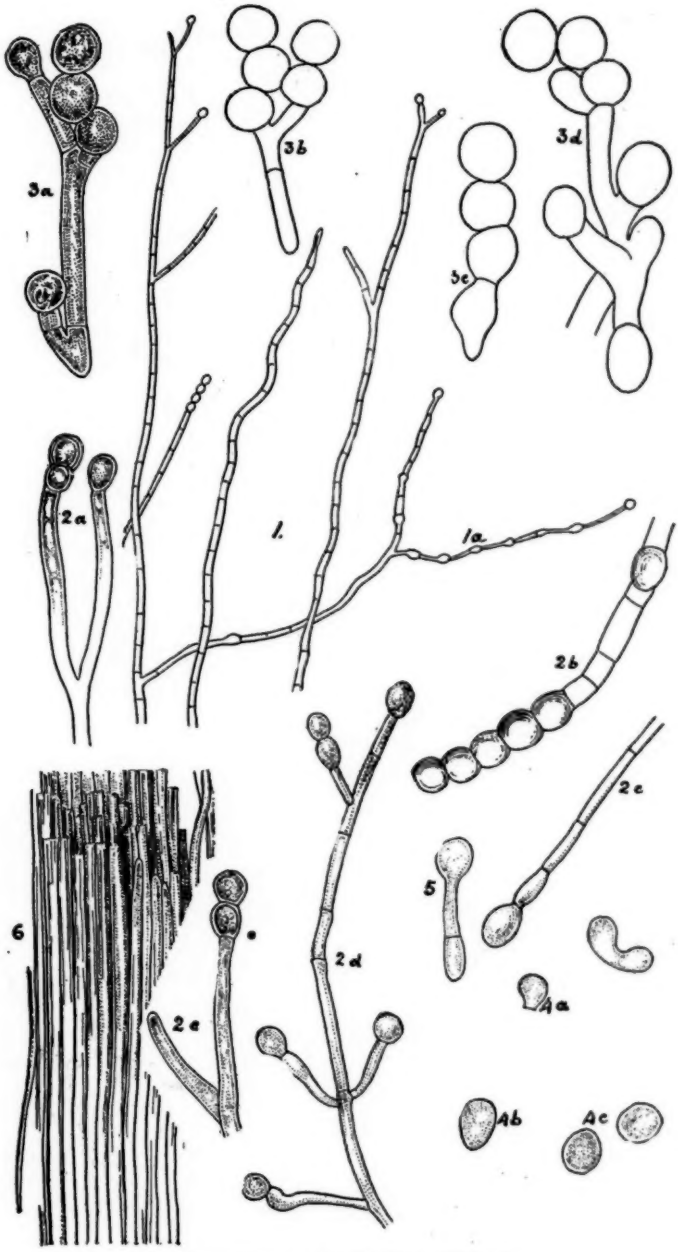
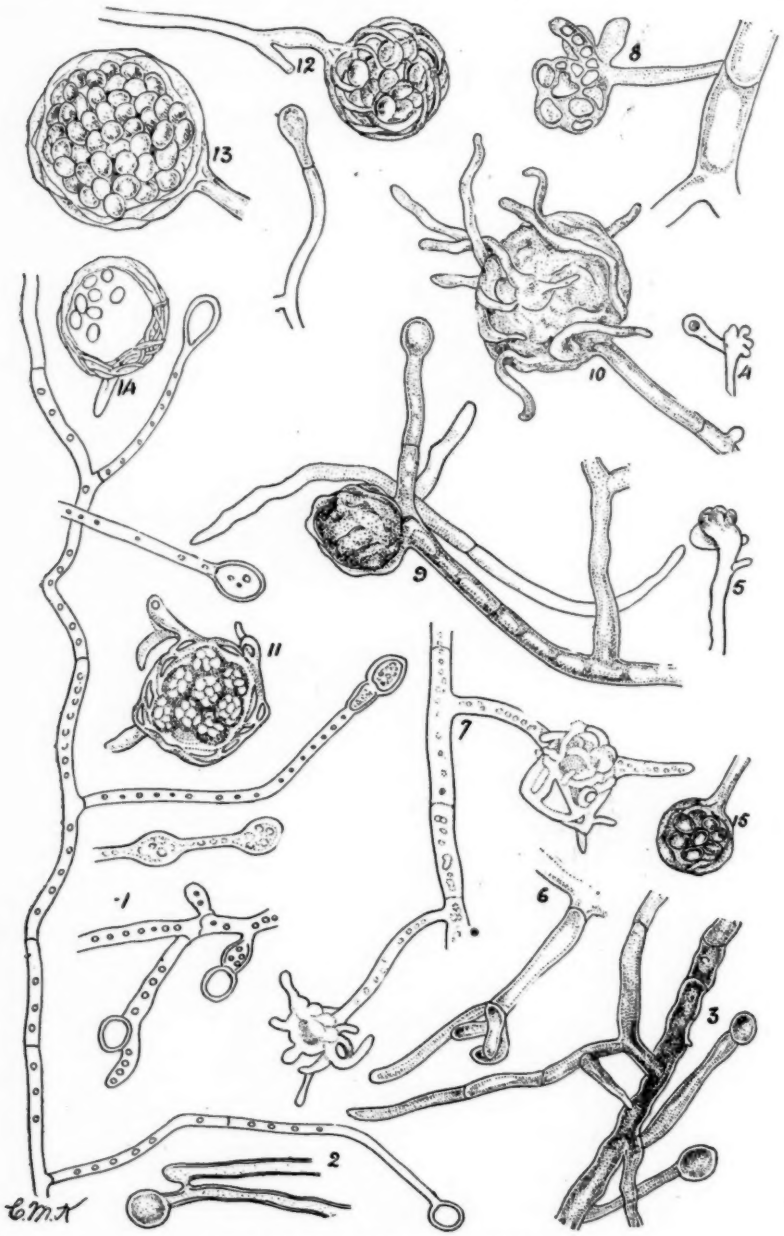
IOWA STATE COLLEGE, AMES, IOWA.



MONASCUS PURPUREUS WENT.

1. Aerial hyphae with conidia and with swellings at *1a* on a branch.
2a, *2b*, *2c*. Conidiophores with conidia.
3a, *3b*, *3c*, *3d*. Conidiophores with conidia.
4a, *4b*, *4c*. Conidia.
5. Conidium germinating.
6. Mass of parallel hyphae from surface of moldy corn kernel.



MONASCUS PURPUREUS WENT.

1, 2. Hyphae with oil drops and conidia from glycerin solution.
3. Hyphae and conidia from silage decoction.
4, 5, 6. Very early stages in formation of perithecium.
7, 8, 9. Sterile hyphae branching and anastomosing about "central cell."
10. Sterile hyphal covering of perithecium sending out branches. These are sometimes tipped with conidia.
11. Optical section of nearly mature perithecium. Spores still within asci.
12, 13, 14, 15. Optical sections of mature and nearly mature perithecia, showing variations in size.

The other outbreak consisted of four horses, three of which died of an acute form of the disease, the symptoms being similar to those already described. The fourth being of a more chronic nature was placed on potassium iodide and nux vomica and recovered. In this outbreak the hay was found to contain a fine mold and was cut from an old pond which had been plowed up and seeded. The water had overflown this, however, and stood for some time. The symptoms and post mortems were similar to those described in the first outbreak, with the exception that no histological examinations were made.

A form of cerebro-spinal meningitis is quite common in Germany. It has also been described in Australia, Great Britain and Russia. It may be that these outbreaks are due to other causes than these already described. Sidamgrotzky and Schlegel found a form of coccus in the subarachnoid fluid, but it was necessary to make subdural injections of cultures of this organism to cause meningo encephalitis. Johne found a diplococcus in the cerebro-spinal fluid of affected horses.

Ostertag found a diplococcus similar to the one found by Johne in the cerebro-spinal fluid in the so-called Borna's disease. They were pathogenic for horses and subdural injections produced symptoms and death similar to cases of Borna's disease. Hutyra and Marek call attention to the fact that bacteriological investigations have not been followed by the same result, but possibly the several investigators were working with the same organism. Nevertheless it remains to be shown whether all cases of cerebro-spinal meningitis are due to the same cause and resembles Borna's disease. On the other hand it is possible that epizootic cerebro-spinal meningitis of domestic animals has no specific cause.

It is apparent that moldy food and water has caused several outbreaks in this country. Natural infection in European outbreaks is also supposed to take place through infected food and drinking water. The disease is not transmitted from one animal to another. Mohler calls attention to the very interesting work of Schlegel in the *Berliner Tierärztliche Wochenschrift,* who as-

sociates with the affection an organism which he termed streptococcus melanogens. Mohler states, however, that whether the disease is of microbian origin or an intoxication has not yet been definitely established.*

Chronic Bacterial Enteritis.

Sometimes called chronic bacterial dysentery or chronic pseudo-tuberculous enteritis is a chronic affection of the intestinal tract of cattle.

This disease was first discovered by Johne and Frothingham in 1895. They observed a case of infiltrative, non-ulcerative form of enteritis which they regarded as due to infection with avian tubercle bacillus. It was again described by Markus in 1904. In 1905 Lienaux and van den Eckhart described the same condition. Borgeand reported a few cases during the same year. Mathis observed the disease in 1906. Bougert found the disease among cattle in the slaughter houses in Berlin. Bang gave a careful description of the disease in *Berliner Tierärztliche Wochenschrift* (1906). McFadyean reported several cases and gave a careful description of the disease in the *Journal of Comparative Pathology and Therapeutics* (1907).

According to Markus the disease is quite prevalent in Holland. In the United States it was first recognized by Pearson in Pennsylvania, later by Beebe in Minnesota and by Mohler in some Virginia cattle. It was my privilege to investigate several cases during the fall and winter of 1908.

In September, 1908, a short horn bull about nine months old with a chronic diarrhœa was brought to the clinic. The owner informed us that he had lost another calf a short time previous from what seemed to be the same disease. Treatment was to no avail. The disease developed gradually, the symptoms in the beginning being scarcely recognizable. The looseness of the bowels developed into a diarrhœa, the feces being watery, not

* As the foregoing article by Dr. Stange also forms a portion of his report as Chairman of the Committee on Diseases and Their Treatment (Ia. Vet. Assn.), we have made it a part of said report; the remainder of which follows.

especially offensive and there was no tenesmus. The appetite varied, but was usually quite good and not completely lost until the disease had nearly run its course. At the same time the emaciation became more marked. While the animal was quite weak there was no marked depression such as would be expected in such grave disturbances of nutrition. The temperature remained about normal until just before death, when there was a slight rise. The pulse was near normal. The coat was rough and staring. Post mortem revealed great emaciation, otherwise no noticeable changes in any of the organs except the small intestines, the mesenteric glands and the gall bladder. The walls of the small intestines were somewhat thickened and the mesenteric glands appeared slightly enlarged and watery. The gall bladder contained about a quart of bile, which on standing separated into two distinct layers, an upper clear layer and a sediment of a rusty brown color. No. definite diagnosis was made at this time.

A few weeks later the owner's farm was visited. Three animals were found affected at that time—one heifer about seven months seemed to be in the last stages of the disease and was killed. Post-mortem examination revealed great emaciation, thickening of the walls of the small intestines, some portions being more afflicted than others. A few small nodules were found. Portions of the intestines, mesenteric glands, kidneys, liver, heart and lungs were taken to the laboratory.

Microscopic examination revealed necrosis of the superficial portion of the villi as indicated by staining properties.

The mucous coat was thickened. The epithelioid cells described by Bang were found, but not in such great numbers as his description would indicate. No affection of gall bladder.

Sections of the mesenteric glands when stained for the acid fast bacillus revealed the presence of the bacillus.

The disease is undoubtedly more prevalent than is generally supposed. It has been reported in Germany, France, Belgium, Holland, Denmark, England and probably in the Jersey Islands. Mohler writes that "at the ninth International Veterinary Con-

gress at the Hague, Drs. H. Markus, J. Bougert, and Meissner read papers on this subject, and while these investigators could not find any identity or relation between the organism of this affection and that of tuberculosis, they were unable to obtain any good results from the various methods of treatment which were tried in the course of their experiments. The usual astringent and antiseptic treatment failed to effect a cure or even an improvement in the affected animals. The same results followed a change in the food and water. Meissner expects to obtain better results with a serum of artificially infected animals and such experiments are now being carried out by him."

According to some infection occurs in the stables and not in the pastures, but undoubtedly it may take place in both places as was observed in the outbreak investigated by me. In all, six animals were lost. (All of the animals under eighteen months old.) It existed on the place for about two years, and one pasture was infected by turning a sick calf with the healthy ones running in it.

The bacilli are passed with the feces in enormous numbers, consequently isolation should be the first step; next thorough disinfection of the stables. In my experience all the young cattle were removed to another farm and the stables disinfected. Cattle over three or four years of age are not very susceptible.

THROUGH the courtesy of one of our Canadian colleagues we received the following clipping from one of the Canadian dailies:

VETERINARY CORPS AUTHORIZED.

The organization of the Canadian Army Veterinary Service is authorized. There will be three branches, the Permanent, Army Veterinary Corps, Veterinary Corps for Active Militia, and the Regimental Veterinary Corps. The officers of the active militia branch will be qualified veterinary surgeons, who will enter as lieutenants and be promoted according to service. Within two years after their appointment they must pass qualifying examinations. The farriers, shoeing smiths will be included in this branch of the service.

HOG-CHOLERA.

By L. Van Es, Agricultural College, N. D.

Since the discovery of a practical method of producing immunity against hog-cholera by Dorset and his co-workers, a new interest has become attached to this disease, and it is on account of this new interest that a discussion of its features perhaps is justifiable.

In order to condense our subject as much as possible within practical bounds, we will not make mention of the history of the disease and of the various phases of the evolution of the knowledge now on hand. We will also avoid discussion of the many points of purely scientific interest for the same reason.

There is perhaps no disease which has caused our farmers more palpable losses than this, while our scientists have for years exerted their best efforts in attempts to find a rational method of prevention.

The earlier attempts of this nature were naturally all based upon the belief that Salmon's hog-cholera bacillus was the only specific cause of the disease, and while, no doubt, various investigators succeeded in rendering animals immune against this organism, it was apparent that a great deal of research work was still to be done before the solution of the problem could be looked for. The later work was begun by de Schweinitz, who had commenced to doubt the relation of the hog-cholera bacillus, and when, after the death of de Schweinitz, his ideas were tested and further worked out by his successor Dorset and his fellow workers, the fact was established that hog-cholera is apparently due to an ultra-microscopic or filterable virus, and that if the Bacillus suipestifer plays a part at all in the etiology of the disease, it certainly is not a sole or primary one.

This discovery not only opened the way for the subsequent immunity experiments, but it also put a new phase on the disease

known as swine-plague. This disease, most commonly associated with hog-cholera, is regarded as due to infection by Bacillus suisepticus, but it is more than probable that this organism also plays a secondary role.

In the outbreak among the swine of this institution, some of our cases showed lesions typical of swine-plague, others those of hog-cholera, while not a few of both diseases. Both diseases, if such they be, were absolutely checked by the use of hog-cholera hyper-immune serum. I will not deny the pathogenic character of Bacillus suipestifer and suisepticus; in fact, I believe that they define largely the patho-anatomic features of the disease, but it is my opinion that, for practical purposes, we may safely cease to make a distinction between the two types of diseases. As to the nature of and the part played by the so-called filterable virus, we do not know whether we have to deal with a true " contagium fluidum " or with an agent capable of either rendering the body specially vulnerable to infection or of rendering certain micro-organisms specially aggressive. Defibrinated hog-cholera blood when injected into a susceptible animal will promptly produce acute cholera, but it is probable that the natural infection takes place by way of the alimentary tract. In such cases the virus is transmitted by the excretions of diseased animals and contaminated food and water. As to the distribution of the disease from place to place, there are a number of well-known factors which play a prominent part such as the congregation of swine from a great number of localities at stock shows, sales, etc. There are many instances in which such shows and sales have proven to be real clearing houses of infection. A prominent part is also played by intermediary bearers, such as hog buyers, who travel far and wide from hog lot to hog lot; neighbors who, in a spirit of sympathy, visit the premises of friends whose hogs are dying with some fatal disease and who carry infection on their shoes into their own hog lots. It is probable that animals such as birds, dogs, or coyotes also are capable of carrying infection to considerable distance. The dust blown from infected lots also seems a very efficient distributor of infection. Food and drinking

water may be contaminated and thus serve as agents of dissemination. It is a well-known fact that hog-cholera has been carried from place to place by means of small streams.

The course of infection, when once introduced into a herd, varies, no doubt, with the virulence of the virus or with its quantity. In some herds the hogs sicken in rather rapid succession; in others the evolution of the disease is slow. In most instances the progress of the infection is not very rapid, and such explosive outbreaks like we may see in anthrax, for example, are practically unknown in hog-cholera; yet in the individual animals the duration of actual disease may be exceedingly short. The period of incubation also varies; after the hypodermic injection of small quantities of cholera blood the first symptoms of sickness usually occur in from 6 to 12 days, but after natural exposure a much longer period often lapses. In some of our local outbreaks the disease made its appearance about one month after exposure.

The symptoms of cholera do not usually present a pathognomonic character. In the beginning of outbreaks per-acute cases are seen. In those, definite symptoms frequently fail and the affected animal may be found dead without having shown any previous indisposition.

In the acute form, which furnishes the greater percentage of our cases, lack of appetite and a disposition to separation from the rest of the herd is an early feature. The affected hog will bury itself in the litter and is not easily induced to stir about. In white hogs we often find a darkening of the skin, sometimes to redness, and the bristles have a roughened appearance. There is redness, and often injection of the visible mucosæ, while the body temperature is elevated.

Gastro-intestinal phenomena are an early feature of such cases. Vomiting is not uncommon and diarrhœa is frequently seen, although it may be preceded by a constipation of variable duration. Diarrhœa and constipation not rarely are of alternate occurrence. The fæces in diarrhœa are liquid of a light or dark yellow color, and emit a fœtid odor. In constipation the fæces are hard, the color is dark or black and often show a covering

of inspissated mucus, which in itself may be tinged with blood. Respiratory difficulty is common. It varies from the symptoms expressive of catarrhal inflammation of the air passages to those of a high degree of dispnœa, occasioned by pulmonary solidification and cardiac weakness. The conjunctivae are swollen and the eyelids may be stuck together by a purulent exudate. The skin in many cases shows an exanthema. On the abdomen, in the axillary, post-auricular, submaxillary perineal regions and on the inner side of the thighs a diffuse or circumscribed redness may be present, which later on may assume a purple tint. The skin so affected often shows blebs, which later on may dry up to black circumscribed scabs. In the chronic forms of cholera, the more prominent features are emaciation, digestive disturbances like an alternating diarrhœa, and constipation. There are commonly respiratory difficulties, as chronic pneumonia is a frequent complication. Such cases frequently show a fair appetite and not rarely lead one to believe that recovery will take place. In the great majority of cases, however, the lesions present are sufficient to cause death. Since the elimination of the Bacillus suipestifer, the diagnosis of hog-cholera can no longer be rendered certain by bacteriologic tests, and we now have principally to depend on the patho-anatomic features to determine the identity of the disease. For this reason we undertake to sum them up in some detail, while in doing so we wish it understood that no attempt will be made in differentiating between the cholera and plague forms of the disease.

In a great number of cholera cases the skin presents lesions of an inflammatory nature. There may be seen a diffuse or circumscribed redness of the submaxillary and post-auricular regions. The same may be seen on the lower surface of the body and is frequently most pronounced in the region of axilla, pubis and the inner side of the thighs as well as the perineum. In some cases the skin lesions consist of decided hemorrhages, dark red in color, now occurring as small punctiform hemorrhages, then again as larger blotches. Pruritus is not uncommon.

As impetiginous exanthema is frequently seen: in such cases vesicles of varying sizes form, which are filled with a serous or sero-purulent fluid. After evacuation or absorption of the contents, the vesicles dry up and become changed to a dark or black incrustation.

In other cases the skin lesions are in the nature of an urticaria, while during the recent outbreak the skin in one case markedly resembled the eruption seen in varicella.

Aside from the lesions mentioned, we frequently meet with passive changes in the skin. These can be attributed to respiratory and circulatory difficulties and are most commonly seen about the ears and amount to a passive congestion, whereby the skin becomes dark in color and more or less edematous. The lymphnodes are the organs which as a rule present the most constant lesions, and it is in those structures that the septicæmic character of the disease is most evident. In the beginning of outbreaks, when death from the per-acute form of the disease is commonly seen, the lymphnodes are often the only organs showing a definite lesion, and in making the post-mortem diagnosis in cases of sudden death, they must never be overlooked. In our autopsies during the recent outbreak we never failed to find those changes in the inguinal nodes, while, in fact, they can be looked for in the other groups as well, although perhaps with less constancy. One of the most common lesions is hyperplasia; the nodules are enlarged, grayish-white in color, while their blood vessels are decidedly congested. They are frequently edematous and after a sufficient duration of the disease are apt to show necrotic foci. In the per-acute cases, the lymphnodes more frequently present the picture of a hemorrhagic lymphadenitis. The nodes are greatly swollen and are of a very dark color, which may even be noticed through the fascia surrounding them. In the chronic forms of cholera, the lymphnodes are often found to be very firm on account of the proliferation of the connective tissue elements. In such organs, secondary changes such as hemorrhages, softening, etc., may be met with. The mucosae of the mouth and pharnyx are sometimes the seat of diphtheritic

lesions, which may become changed to deeper ulcerations, according to the nature of the secondary infection, which may be playing a part. A croupous-diphtheritic tonsilitis is very common and when found should always arouse the suspicion of cholera.

In the more acute cases the mucosa of the stomach frequently shows a marked hemorrhagic inflammation, which in more advanced cases may become complicated with diphtheritic lesions.

The intestines are the seat of the most classic lesions of the disease, although the most typical ones are not always a constant feature. In a small portion of the cases there is a catarrh throughout the entire tract, in which no erosions of the surface can be shown. The mucous membrane as well as the adenoid structures are swollen. This condition is not uncommon in the per-acute form of the disease.

In quite a number of the per-acute cases a hemorrhagic enteritis is present without showing any diphtheritic lesions. In such cases the entire tract may be involved, although most commonly the lesions are most marked in the large intestines.

The lesions vary much in intensity; there may be diffuse redness, especially of the mucosa, but often also involving the other tunics. Aside of this redness, hemorrhages in the mucosa, submucosa and under the serous coat are common. They vary in size, from the mere punctiform specks to large blotches of the size of a half a dollar. They also vary much in color, ranging from a bright red to a deep black, while in many instances I have seen a rusty color.

In the severe per-acute cases the entire intestinal wall is hemorrhagically infiltrated, the wall itself being thickened and tingescent. In such cases the intestinal contents frequently have a liberal admixture of blood. Accompanying such lesions we find similar ones in the mesentery and meso-colon, while the corresponding lymphnodes are also hemorrhagically infiltrated.

The follicles of the intestinal mucosa may be the seat of inflammatory changes, giving rise to the anatomic picture of an enteritis follicularis.[1] In such a condition the follicles are

1. Pools. Varkenssickten En Nederland.

markedly swollen and are conspicuous as white round nodules. Their contents is softened and can be readily squeezed out. The intestinal lymphoid tissue is always hyperplastic. Ulceration of the involved follicles may lead to perforation. The best known lesions of cholera are the intestinal ulcerations. Even here many variations are seen. In one form we see a general confluent, croupous-diphtheritic enteritis in which the mucosa is covered with a grayish-white croupous exudate. When this condition has existed for some days the intestinal wall becomes thickened and rigid and the mucosa becomes necrotic and assumes a dark or black color. In other cases the ulcerations are isolated and vary from superficial erosions with a diphtheritic covering to deep excavations into the thickened intestinal wall. In some of such cases actual perforation takes place, causing sudden death by shock and peritonitis on account of the escape of the contents. In other cases again there is an incomplete perforation just sufficient for the escape of small amounts of intestinal contents. Such accidents are frequently followed by a plastic peritonitis marked by extensive and firm adhesions, binding the intestinal mass into great conglomerations, which often can be found through the abdominal parieties of the living animal.

In quite a few of the cases we meet with and especially in the sub-acute and chronic ones, there may be evidence that the ulcerations are being repaired. In such cases a sharp line of demarcation differentiates the necrotic parts from the normal intestinal tissue. The croupous covering of ulcers becomes drier, shrinks up and assumes a dark or black color, while at the same time it is being pushed into the lumen of the gut by the proliferation of the normal tissues at the base of the ulcer. The characteristic button thus formed may become pedunculated and drop off, leaving a light-colored cicatrix. In acutely fatal cases of cholera, buttons are not often seen, as they are more essential to the chronic cases.

The spleen does not offer anything characteristic. There may be hemorrhages and petechiæ under the capsule, while in many cases nothing abnormal can be seen in this organ. In a number

of cases the organ is considerably enlarged and of a black color. In old chronic cases we may find necrotic foci in the spleen pulp.

The liver often shows a marked hyperæmia in the acute cases and shows a parenchymatous degeneration in nearly all cases. In some of the more chronic forms of the disease this degeneration may be very complete, so as to justify the term " fatty liver." In such cases the organ is of a light yellow color.

The peritoneum often participates in the disease. The lesions range from small hemorrhages to a real fibrinous or plastic peritonitis. In the latter cases the lesions are probably due to infection permitted to enter through lesions of the intestinal wall.

The kidneys show degenerative phenomena in all cases, and in quite a few the kidney lesions remain confined to a more or less developed degeneration of the parenchyma. In the greater number of cases we find also evidence of hemorrhagic nephritis in the shape of a varying number of small punctiform hemorrhages in the kidney substance and under its capsule. In one instance I found a very marked hemorrhagic infiltration of the entire urinary tract, with an active subcapsular hemorrhage of one of the kidneys.

The upper air passages are frequently the seat of catarrhal conditions, while the lungs may present a variety of lesions, the majority of which propably being of a secondary nature.

Pulmonary congestion is very frequently found as well as edema, while pneumonia is exceedingly common and is perhaps one of the most fatal complications in the chronic cases.

The inflammatory process may be lobar or lobular. In the former, usually confined to the anterior lobes, the line of demarcation between normal and inflamed lung is sometimes very sharp. The inflamed areas are usually of a light red, brownish or gray color.

In the lobular form, inflamed lobules may be found scattered through the entire lung and may be completely surrounded by intact lung tissue.

In cases of some time standing necrotic changes are common, when necrotic foci spring up in the inflamed areas. The con-

tents of these foci is cheesy or softened, while in some cases they are very similar to real abscesses. It is very probable that the patho-anatomic picture of cholera is largely determined by the organisms which produce the secondary infection.

The pleura is frequently involved. This membrane, especially its visceral portion, is often the seat of petechiae, while intense adhesive pleurites are by no means uncommon.

The heart in the chronic cases commonly has a parboiled appearance owing to fatty degeneration of the myocardium, while in the acute ones we frequently find hemorrhages of varying size under the epicardium.

The pericardium often shows hemorrhages, while adhesive pericarditis is by no means uncommon.

That hog-cholera is not a disease which offers a field for curative intervention is a fact so well known that it will not be necessary to devote much space to the discussion of either treatment or prognosis. The mortality of the disease, in spite of the fact that for years the market has been glutted with cholera remedies, still continues to range between 80 and 100 per cent. Let us therefore turn to the more hopeful field of prophylaxis.

Even this field, up to a year or so ago, offered but a very gloomy aspect. It is certain that the practice of isolation, segregation, disinfection, sanitation, etc., always had an inhibitive influence upon the spread of the disease, but their influence was not so that they could be relied upon as an absolute protection. For a long time it was apparent that, if hog-cholera was to be eliminated, it would have to be done by means of some process of immunization, and for many years science has occupied itself with this problem. It was not, however, until the discovery of the fact that the hog-cholera bacillus is not the primary cause of the disease that the way was opened to a practical solution of the immunization problem, because now experiments could be made in which the Bacillus suipestifer played no part. As the result of the research made by Dorset, McBryde and Miles, it was found that hogs which had recovered from an attack of the disease possessed a very potent immunity, but that their blood

could not be absolutely relied upon to confer immunity to other swine injected with it. When the immune hogs, however, were previously treated with large amounts of virulent blood, which they tolerate very well, their blood acquires a marked antitoxic property and confers a passive immunity to susceptible hogs injected with it.

The hyper-immune serum forms the base of the Dorset method of immunizing against hog-cholera.

The method consists of rendering the animals passively immune, and if an active immunity is desired to inject them with a small quantity of virulent blood simultaneously or to expose them to natural infection while their immunity lasts.

The immunity obtained after a serum injection only lasts about four weeks, but if this immunity is rendered active, the animal will be protected for six months, probably much longer.

The serum is injected in doses ranging from 20 to 60 c. c., according to the size of the animal. The injection is made subcutaneously on the inner side of the thigh. If virus is used it is injected in doses of 2 c. c. simultaneously in the thigh of the opposite side.

In some cases the immediate result is a small circumscribed swelling at the point of injection, and it is possible that this swelling is due to a local infection by the needle. It may also be due to the small amount of carbolic acid, which has to be added to the serum in order to insure its keeping qualities.

The efficiency of this serum has been demonstrated in many instances, notwithstanding that failures have also to be recorded, and the question now presents itself as to the manner in which the Dorset method of immunization can be applied in order to secure the eradication of hog-cholera.

It seems certain that the use of the method can be depended on to eliminate hog-cholera as a source of serious loss to our swine breeders, but if this has to be accomplished, systematic action is necessary. The manufacture of the serum and virus should be under the control of the state live stock sanitary authorities. Those products should be placed at the disposal of swine

owners free of charge or at cost, while their use, especially that of the virus, should be left to trained veterinarians operating under the direction of the state authorities. The promiscuous use of the method by everybody will not have a general good result, while the sale of virus by manufacturing concerns should be prohibited, as it is not safe to place virulent material at the disposal of the general public.

It seems best to entrust the manufacturing of the serum to the state experiment stations and to make it the duty of the state live stock sanitary authorities to superintend its systematic application.

All cases of apparent infectious swine diseases should be promptly reported and by methods of publicity swine raisers should be educated to that effect. Such reports should at once be acted upon by a thorough investigation, and when the death turns out to be due to cholera, immunization should at once be undertaken.

In the immunization of herds in which disease has occurred, it is probably better to use the simultaneous virus injection than to depend upon natural exposure. From the experience of the writer it seems, at least, that there are cases in which the infective material gains entrance to the exposed hogs so slowly, or in which the infectious material introduced is so slight, that either the passive immunity has already been used up before the introduction of infection or that the amount of natural virus was too slight to produce an active immunity. The results in both cases are that a permanent immunity is not obtained and that in course of time the animals sicken anyhow. The character of special strains of virus no doubt also plays a part.

We therefore deem it best to immunize by simultaneous injection, so that we make certain of actual exposure.

The injections should be confined to healthy hogs only. The serum has no curative properties and the injection of sick hogs would only mean a waste of material. Furthermore, it would be a cause to permit sick hogs to continue their existence for a while longer, which again would mean an additional amount of

infective material to be scattered far and wide. It is our opinion that after the immunizing of healthy hogs, all sick ones should be immediately destroyed and burned and should, in spite of immunization, some hogs develop cholera, they should be disposed of in a similar manner.

This measure is not designed for the protection of the herd immunized, but simply to prevent infectious material from scattering over a community.

In case immunization is done, immediately after the occurence of the disease, it may be sufficient to confine action to this one herd unless other swine herds are close by, when it would be better to immunize all hogs within a radius of half a mile.

When the infection has already made considerable headway in one or more herds, it seems advisable to include in the immunizing process all hogs within a radius of three or four miles in order to surround the original focus of infection with a zone of immune animals.

We also consider it of advantage to have the veterinarian who makes the injection prepare the virus to be used with the serum, whenever such is possible. The reason for preferring this procedure lies in the fact that in our experience we encountered some difficulty in preventing putrid changes in stored virus, no matter how carefully prepared and stored. Putrefaction does not seem to destroy the virulence of the blood, nor have we complaints about the virus issued, but on general principles we should prefer the fresh virus.

This virus can be prepared readily by the veterinarian in charge of the immunizing operations from sick hogs found in the outbreak. Such animals are best fitted for this purpose when they are at their sickest. The necessary appliances could be furnished in a sterile condition by the experiment station supplying the serum. When no sick hogs are available, the virus stored previously should be used.

All this kind of work should be done at state's expense, as it is done with a view of general protection and as under such an arrangement immunization can be made more universal. Fur-

thermore, local veterinarians in general practice, who should in order to assure prompt action be employed for this work as much as possible, should be given opportunity to familiarize themselves as much as possible, with the post-mortem diagnosis of the disease, the preparation of the virus, and the method in general. This should be arranged for at the serum plant of the experiment station and at state's expense.

In addition to the measures here recommended arrangements should be made by the managements of stock shows, sales, etc., with the live stock sanitary authorities to have all swine exhibited properly immunized, so as to eliminate such institution as possible disseminators of infection.

The ordinary methods of quarantine, disinfection, and proper disposal of carcasses should also be adhered to.

THE COLORADO AGRICULTURAL COLLEGE VETERINARY MEDICAL ASSOCIATION, meets every Monday evening at 7 o'clock in Pathology Hall.

DR. C. B. OUTHIER, Salinas, California, has been traveling through Mexico for the past three months, spaying cattle, and expects to return home soon. He has been in the heart of the Mexican revolution; his headquarters having been at Chihuahua.

DR. GEORGE A. HANVEY, JR., Veterinarian, Sixth U. S. Cavalry, stationed at Fort Des Moines, Iowa, was married December 7th to Miss Georgianna Dunn, of Nottoway, Virginia. We wish them all the joy and happiness that wedlock can bring them.

PROF. REICHEL, of the University of Pennsylvania, will read a paper before the members of the Veterinary Medical Association of New Jersey at its annual meeting at the Trenton House, Trenton, January 12. Other prominent men from New York will also probably address the association.

TETANUS.*

By Dr. P. F. Bahnsen, Americus, Ga.

The presentation of a paper on Tetanus before an Association, some of whose members are credited with constant recoveries from this dread malady in from 75 per cent. to 90 per cent. of their cases seems indeed presumptuous, especially so by one who, in the interest of truth and candor, must admit his personal experience to have been a serial succession of fond hopes and dismal failures. This paper was born neither in the hope of advancing any new and unheard of theory nor in resentment of the flattering reports which, of late, have crammed the pages of professional and semi-professional—or rather commercial-professional literature; but its aim is to stimulate sane, unbiased reflection as regards the therapeusis of this horrible affliction instead of basking in contentment upon the foamy laurels of untried neophytes or the glittering endorsement of an occasional enthusiast. Right here I want to emphatically disclaim any intention of personal reflection toward anyone, even should their published reports fall under the hammer of my criticism.

In addressing a paper on Tetanus to this body I am sure it is superfluous to dwell upon definition, history and aetiology of the disease producing factor, these facts are more or less familiar to all present; and then, it is especially the practical phase of the subject which I expect to bring to your attention.

A brief résumé of the pathogenesis of the Tetanus Bac. will aid in getting the subject clearly before us.

1. Fresh cultures of from two to five days old are only mildly toxic, the toxicity of the culture increasing progressively with its age.

* Read before the Alabama Vet. Med. Association at Montgomery, July, 1910.

2. Long continued washing of extremely toxic cultures deprives the spores of their toxine, and thus prepared even large doses prove harmless when injected into susceptible animals. Excessive, continued heat (80° C.) also destroys the toxicity of the culture without destroying the spores. Yes, these cultures, harmless, or nearly so, within themselves when injected into a bruised region or accompanied by grit, dust or foreign bodies, or when introduced into a region previously injected with a negative chemotactic fluid, such as Lactic Acid, invariably regain their virulence and produce the disease.

3. The toxines, no doubt, represent a specific secretion of the bacillus. It is soluble in water and insoluble in alcohol, chloroform and ether, and extremely poisonous. One c.c. of the filtrate of a highly virulent culture is capable of killing a 1,000-pound horse. Other animals require relatively larger toxic doses.

4. The action of the toxines is only manifest when injected subcutaneous, intra-muscular, intra-venous or intra-cerebral; even large doses administered by way of the digestive organ proving absolutely harmless. (Hutyra & Marek.)

Admittedly Tetanus is not primarily the result of an infection with the ladle shaped Bacillus of Nicolayer, but the characteristic symptoms are the consequence of an intoxication, the nervous system showing a strong selective affinity for the toxins eliminated from the constantly sporulating bacillus. And yet, the intensity of this intoxication is regulated by the same fundamental laws which govern the development of an infectious attack. Briefly stated these factors are: The variable susceptibility of the affected individual, the virulence of the invading organism—to which, in case of intoxication, the strength of the destructive toxins should be considered—and the condition of the atrium of infection, which may be either favorable or unfavorable to the development of the invading micro-organism. A careful consideration of these conditions enable the practitioner to prognosticate, with reasonable certainty, the outcome of almost any attack; the errors in a prognosis thus founded is

invariably due to baseless presumption as regards the period of incubation, but I will come to this later.

The soil, especially such as is strongly permeated with manure, stands convicted of being the most common source of infection. We therefore find tetanus a frequent sequela of such wounds as offer the greatest possibility of soil contamination. Being obligative anaerobic, deep penetrating infections offer a more favorable development for the bacillus; this accounts for the preponderance of cases following such injuries as deep penetrating wounds to the lower parts of the limbs, castrations, especially with clamps, and penetrating wounds on the ventral body surface. Not infrequently our most painstaken examination is without result, the atrium of infection is closed, the site of infection cannot be located—we have a cryptogenetic infection.

The pathogenic action of the bacillus is not manifest immediately upon its introduction into the animal. A variable period of time intervenes between the introduction of the cause and the development of its effects. This lapse of time constitutes the period of incubation. Its length, depending upon the conditions previously named, *i. e.*, susceptibility of the individual, virulency of the invading organism and favorable or unfavorable conditons for the development of the bacillus at the site of infection. enable us, with reasonable certainty, to determine the prognosis of an attack. We find the period of incubation to vary from twenty-four hours to as much as three or four weeks. Such variable development cannot be, and is not, without significance to the outcome of an attack; however, the possibility of a secondary infection, subsequent to the date of first injury, must not be overlooked. Mistaken presumptions in this matter naturally lead to erroneous deductions. Not only do these factors sway the pendulum between certain death and ultimate recovery, they also form the paramount consideration as regards the period of convalescence in case of recovery.

No doubt, some of you will say: "How about our treatment?" Have you ever tried this, or that, or something else? Well, if I were addressing an assembly of my patrons who had

entrusted me with the care of their lockjaw cases during the past eighteen years, I doubt having the courage to own up to my many trials, to the times when at their expense I have hoped the defeat and failure were the only result in reason to expect; to say nothing of the many times when I myself, spurred by the fire of enthusiasm, expected flattering results from a line of treatment because it came endorsed by those who are acknowledged leaders of undoubted ability and unquestioned integrity, only to enlarge my store of disappointments.

How easy it is to come to an empirical conclusion in regard to our treatment. Accepting a few successful terminations as the result of our treatment is much like casting bouquets at one's own ability, and to use the expression of the Irish maid: "We love to talk about it!"

Any well read veterinarian can recall the record of flattering reports which have lit the pages of veterinary journals, and even text-books, filled them with new hope only to find it a bubble, a delusion. And yet I firmly believe that in all cases the records are correct, the recoveries have occurred; but, and there lies the pinch, the natural tendency toward recovery has been completely overshadowed. *Many cases die annually as a result of ill-advised and indiscreet treatment that might have recovered if let alone.*

Who among the older practitioners has not tried "Cannabis Indica" on the strength of Mr. Richard Rutherford's experience—quoted in Finlay Dunn's Veterinary Medicine; or "Gelsemine," at the suggestion of Dr. W. L. Zuill, published in his translation of Friedberger and Froehner; or, with Cadiot tried sodium sulphate and bicarbonate in large and continued doses. Did not the carbolic acid treatment—a la Bacelli—receive unstinted praise at the hands of both veterinary and the medical profession? All veterinary literature, foreign as well as American, resounded with eloquence the curative virtues of phenol solutions. As to failures—well, they never made good reading, consequently few are reported. I shall not attempt to enumerate *all* the drugs that have, first and last, been endorsed as "gilt-edged" in the treatment of tetanus—Lugol's solution

intratracheally; oxygenated water intravenously, cholesterine hypodermatically, orally curare and potassium bromide, chloral hydrate both orally and in rectal infusion, atropine, morphine, pilocarpine and arecoline—I even find tallianine among the list that has been tried and endorsed.

Operative surgery has been advanced to fill the wants of a certain and effective panacea. Neurectomy, in case of tetanus resulting from injuries to the hoof, has been endorsed by Rosco, who claimed recovery as a result of his operation.

Depleting the patient by venesection, both with and without additional treatment, has been endorsed. Thus "Habicht" drew 9 liters of blood every fourth day, injected iodipin 25 per cent. every following day and rested every third day—two straight recoveries. "Crinon" extracts 10 liters and repeats after three days, then 10 c.c. antitoxin and 120 grammes of bromkali for four days—recovery in two weeks. "Dumas" duplicated this feat.

But the most flattering surgical cure emanated from the pen of a Winterset, Iowa, M. D. Honest Injun like he confessed that his was but an improvement over the procedure of a Mr. Miller, who merely knocked the patient in the head and fractured his skull; even this crude method led to certain recovery. The story was so good it jarred my think-pan, and I assisted four tetanus patients to "lie down with patriarchs of the equine world" according to the formula of "W. F. Sterman." Other veterinarians who have tried it have told me of equal results, yet the editor of *Clinical Medicine*, in August number, 1909, says: "We have received a number of very interesting favorable reports from veterinarians concerning the Sterman operation upon horses suffering from tetanus. In one horse operated upon in this city, however, *the method seemed to be an entire failure.*"

Says Dr. Sterman in his article (*April*, 1909, *Clinical Medicine*): I refer to the peculiar gas formation with the toxins, both primarily and secondarily. This gas is present everywhere, from the beginning of toxin-formation, is intensely irritating to the nerves even at the seat of inoculation, etc."

Really I must confess that in more than two hundred cases that have come under my observation, this gas production has not been observed; nor do I recall a similar recorded observation in any veterinary literature at my command (excepting the reference to this matter in Vol. 2 of *Merrilat's Surgery,* page 447). "Brunner in 1898 proved that gaseous changes are notably active from the very period of incubation." I am inclined to the opinion that in those cases where gas-production at the point of infection is manifest, it is due to the simultaneous infection of the wound with the Bac. Oedematis maligni. And, as regards the irritating effects at the seat of inoculation, my observations have been exactly to the contrary. Animals showing distinct lameness and intense pain, as the result of an injury, prior to the development of the general symptoms of tetanus, invariably show less lameness after. I look upon the complete suppression of pain in such a case at the site of inoculation as an almost certain indication of a fatal attack. (Of course, intense rigidity naturally modifies any manifest symptoms of lameness—mechanically.)

Dr. Sterman admits that: "The equine race is the one most frequently affected, and my experimental work has been with it. A horse may be very dangerous in the violent throes of tetanic convulsions, but when the skull is opened, and the gas escapes with a hiss, the horse quickly regains his feet, soon nickers for something to eat and soon eats it, and the trouble is ended then and there." *How simple, how marvelous, how certain,* if it could only be true.

If I appear in the rôle of an iconoclast, it is with the hope that when our present illusion concerning the cure of tetanus has been destroyed a more formidable line of therapeutics will be introduced; with this apology I will review the claims and the virtues of Tetanus Antitoxin Serum. As all of you know within the last few months, a general revision of the strength or rather standardization of commercial veterinary antitoxin has taken place. This did not occur without the usual presentation of both sides to the controversy. I will call your attention to

the statement of Dr. T. B. Rogers, of Woodbury, N. J., who states (REVIEW, vol. 37, page 507): "A great many of those horses are in a tetanus district, and before that method (immunization with antitetanic serum) was instituted, many cases occurred. In the six years this method has been followed, we have never had a death from tetanus, and we are giving a serum *that did not read over fifty* (50) *American units.*" The author argues with good reason. If 50 units are sufficient for protection, why increase the cost of treatment by injecting 1,500?

As a prophylactic, the value of antitetanic serum can hardly be questioned. The only question involved is the size of the dose necessary to effect immunity. Of course cases are on record where animals developed tetanus after receiving an immunizing dose of the serum, this may have been due to a special susceptibility of the animal so injected, or to an inferior product of antitetanic serum, either or both. Universally, however, the serum has, as a prophylactic, secured the endorsement of the general practitioner; not so with the larger, so called "curative doses." It is true a good many cures (?) have been reported, but a careful study of those cases that give a complete anamnesis show that they were the class of patients that naturally had a fair chance to recover.

Right here I want to assert that, in my opinion, meteorological conditions have a certain influence upon the severity of the disease. To illustrate, in 1908 I only lost two out of seventeen tetanus cases, yet under similar treatment I was forced to haul five patients in rapid succession to the crematory in 1909 (two of these cases were trephined) and then, taking new hope in large doses of antitetanic serum, three more followed at an enormous expense to the owner. This made a total of eight fatal terminations out of eleven cases in 1909. The later part of 1908 I was eager to treat tetanus patients; one year after I studiously avoided any case that looked unfavorable to me. It is needless to say I have predicted fatal results and seen recoveries, and have held out hope of recovery, and then my patient died. I

have seen recoveries of well developed cases under the most unfavorable circumstances, and absolutely without treatment.

Practically the curative doses of antitetanic serum have not been successful, neither in my hands nor in the practice of professional colleagues, of my personal acquaintance, though they annually treat very many cases.

And our record stands by no means isolated.

According to the "Statistical Veterinary Sanitary Report of the Prussian Army (Anno 1906)," forty-nine horses suffered from tetanus, 70 per cent. died. Out of ten treated with tetanus antitoxin, eight died, and in two cases it even failed as a prophylactic. Anno 1907 of the same report records forty-five cases with 9 per cent., or four recoveries to 91 per cent. fatal termination. Again the report states: "Medical treatment as well as antitoxine injections were without result. Again in 1908, forty-five were affected with tetanus, eight recovered and thirty-seven died, a loss of approximately 82 per cent. Again we find in this report: "Injections of antitoxin had no influence on the progress of the disease."

Dieudonné and Chapellier, two French veterinarians, in separate articles, recorded in the *Rec. de Med. Vet.*, 1909, laud the value of immunizing doses of antitoxin, but deny any virtue to the curative claim of this preparation.

Pochhammer, in a very elaborate report, *Experimentelle Untersuchungen ueber die Entstehung des Starrkrampfes und die Wirkung des Tetanustoxines im menschlichen und tierischen Organismus* (published in *Volkmann's Samml. klin. Vortraege,* 1909), comes to the following final conclusion:

The toxins hidden and fixed in the nervous system are not affected by the antitoxins.

Serum injections are therefore useless in well-developed tetanus.

The value of prophylactic injection is, at least, doubtful.

Even in actively high-immunized animals fatal tetanus results from continued injection of toxin in small doses, since

parts of the toxins are taken up by the nervous system where they accumulate.

In the *Medical World* Dr. J. C. Dreher gives the details of two cases of tetanus treated successfully with physostigmine; a third case sent to a hospital and treated with antitoxin died. In fact medical literature is rather barren of reports of successful treatment of tetanus with antitoxin. Why so?

AUTHOR'S CORRECTION.—Dr. D. B. Clark desires to correct the name "Mr. A. Meyer," as it now appears in his paper on "Johne's Disease," published in the December issue of the REVIEW to "Dr. K. F. Meyer."

IF some of our readers who have hospitals of medium size will advise Dr. L. B. Michael, of Collinsville, Ill., where he can obtain plans for such a structure, they will confer a favor upon an appreciative brother. The doctor's address is 628 East Main street.

SOME changes and additions to the committees appointed by President Glover of the A. V. M. A., published in the November issue of the REVIEW. Dr. S. B. Nelson's name is added to the Executive Committee; Dr. Geo. H. Berns' name replaces Dr. Nelson's name on the Finance Committee; Dr. L. Van Es' name replaces that of Dr. D. S. White on the Committee on Intelligence and Education.

DR. W. REID BLAIR, who has been the faithful secretary of the Veterinary Medical Association of New York City for the past five years, having served with three presidents, the first two years of which were with the late lamented Roscoe R. Bell, was honored by being elected to the presidency of that organization at its annual meeting in December. The association is to be congratulated.

DR. H. PRESTON HOSKINS, Philadelphia, Pa., was elected National Secretary of the Alpha Psi Fraternity at its recent biennial convention held in Chicago the last week in November. We congratulate the doctor as the recipient of this honor which was bestowed upon him, though not in attendance at the convention. We also *extend* the congratulations to his father, our old friend and colleague, Dr. W. Horace Hoskins.

IMMUNIZING AGENTS AND THERAPEUTIC SERA IN VETERINARY MEDICAL PRACTICE.*

By W. H. Dalrymple, Baton Rouge, La.

With the rapid advances made in recent years in reference to the use of the various vaccines and sera, the time seems fast approaching when the therapeutic art will have resolved itself into what might almost be termed "vest pocket" medication, not only with respect to the treatment of disease in the human family, but also in the lower animals with which the veterinarian has to deal. And with our ever-increasing knowledge and experience concerning the action and results from the use of these products at the present time, this form of therapy would seem to be, not only the ideal, but likely to be the method of the future in veterinary as well as in human practice.

No doubt the exhaustive investigations into the cause or causes of immunity, and the various theories based thereon, such as the exhaustion theory, the retention, the acclimatization, the antitoxin, Ehrlich's side-chain, Metchnikoff's phagocytosis, etc., and later, the opsonic theory of Wright and Douglas, have all contributed to a more extended use and a fuller understanding of these valuable biologic agents.

As a leader in this form of therapy, most of the credit must, we think, be given to the late Louis Pasteur for his classical experiments with anthrax vaccine, which is now in use, more or less, in all civilized countries where anthrax or charbon is known to exist, and, when properly and intelligently employed, has yielded very gratifying results.

The Pasteur lymph is a double-dose vaccine, although not used simultaneously, as is the case with some other similar products.

* In connection with report of Committee on Intelligence and Education, A. V. M. A., San Francisco, Cal., Sept. 1910.

The culture from which the first lymph is obtained has been exposed to a temperature of about 42 or 43 degrees Centigrade, in the presence of oxygen, for about 24 days, which tends to attenuate the organism and render it non-sporogenous. In the case of the second lymph, the exposure is only for about twelve days, under similar conditions, which leaves it less attenuated and, therefore, stronger, so to speak, than the first lymph. The first and second lymphs are injected subcutaneously at an interval of from ten to fourteen days. Immunity, which lasts for about twelve months, is conferred on the animal in about from ten to fourteen days after the administration of the second lymph. Since, therefore, it takes in the neighborhood of twenty-eight days to obtain immunity from the use of the double-dose vaccines, the most satisfactory results have been obtained in anthrax-infected districts when vaccination has been performed early in the spring; so that immunity has been reached before the season of the year sets in (summer usually) that favors the development of the infection on the previously-infected area or territory.

Failure to attend to early vaccination has, in our opinion, tended to lessen the value of the product, and has brought about adverse criticise of it without just cause. Or, in other words, owing to vaccination not having been adopted until the disease has become existent, the animals have become exposed to infection before immunity was reached, and frequently with untoward results.

Another method of vaccination against anthrax more recently employed is the sero-simultaneous method of Sobernheim, which consists of an injection of serum from a hyper-immunized animal, and one of virulent culture at the same time.

This method is said to confer a quicker immunity and seems to have given more or less satisfactory results in the hands of those who have used it, although the writer has not had any personal experience with it.

Still another vaccine, put up in the dry or pellet form, is in use. It is a single-dose vaccine; is said to be prepared from dead

organisms, and confers immunity in a shorter period of time than the double-dose preparations.

The writer is not in a position to express an opinion as to the most effective method or form of anthrax vaccine. Provided, however, the material has been carefully prepared and standardized attention paid to the expiration date, which is stamped by the manufacturers on some of the products, and vaccination performed sufficiently early in the season to insure immunity before animals are exposed to natural infection, good results seem to have followed the use of the vaccines at present upon the market. However, in order to secure the maximum of success with these products, in addition to what has already been stated, their use ought to be solely in the hands of the qualified veterinarian, as there are certain antiseptic precautions necessary to success with such products with which the layman is not expected to be familiar. And, in the judgment of the writer, it would add greatly to the success of preventive vaccination against anthrax, and save a great deal of valuable live stock property, if the manufacturers of these products would lend their aid in seeing to it that only qualified veterinary practitioners could handle vaccines of this character.

The Black-leg vaccine of Arloing, Cornevin and Thomas needs no special allusion in this short report, as the writer believes that most members of the profession are familiar with the success which has followed its use for quite a number of years, and which still seems to continue.

Bacterins or autogenic bacterial vaccines appear to be coming more into use as time goes on; and recent professional literature seems to show quite a number of successes with this form of microbination.

This system of medication seems to be based upon the opsonic theory of Wright and Douglas, viz., that the patient's blood-serum has within it a chemical substance which has the power of acting upon the invading organism in such a way as to render its destruction by the phagocytes much more easy. These antibacterial substances, or opsonins (from the Greek,

meaning "prepared for being eaten") in the serum which seem to influence the phagocytic action of the white cells, are said to act by chemically uniting with the invading bacteria, and so altering them that the leucocytes are able to destroy them, while not stimulating or otherwise affecting the leucocytes themselves.

There are many different opsonins in each blood serum; one variety said to be for each kind of bacterium; and the opsonic index may be estimated against such as staphylococci, streptococci, the tubercle bacillus, etc.

By the opsonic index, just alluded to, is meant the ratio of the organisms swallowed by leucocytes incubated in the patient's serum, to those engulfed by an equal number of leucocytes incubated under similar conditions in healthy serum.

Dr. Archibald, of California, very ably alluded to this method of vaccination in an address at the Chicago meeting last year; and the successes he seems to have had, as well as those of others, brought out in the discussion which followed, would certainly suggest a bright future for this form of medication in those cases in which such is indicated. It may be, and we think it quite likely, that the important investigations of Wright and Douglas in connection with the opsonins, will be of immense assistance to the veterinary, as well as to the human, practitioner of medicine.

A most important step in vaccination is that of endeavoring to immunize young cattle to tuberculosis. Quite a number of tests have been conducted both in this country and abroad, but we believe we are correct in saying that the method has not, as yet, proved to be a universal success from a purely economic point of view, and requires more time and further experimentation.

Serum therapy seems to be advancing with rapid strides, if we are to judge by the many serums that are now upon the market.

The one longest in use by the veterinary profession is, perhaps, the antitetanic. This tetanus antitoxin has its strong advo-

cates; while there are others who appear to have little faith in its efficacy. Still those of us who are able to "hark back" to the days prior to its use, and can remember the hopelessness with which we viewed our tetanus cases; and then compare those days with the present time, when we have so many recoveries from the use of the antitoxin, and the large number of cases in which the disease fails to develop when an immunizing dose has been administered, although conditions are much the same now as then, cannot but feel that this serum has proved itself a very valuable agent, and a decided advance in the treatment of this hitherto much more dreaded disease.

Personally, the writer has had very good results from the use of this serum, even as a therapeutic agent. It is, however, as a preventive that it is of the greatest service. A year or two ago we made the request of a professional friend that he use immunizing doses of antitoxin whenever the opportunity offered itself, and that he keep a record of his results, which he very kindly consented to do; and out of some 428 cases in which he had used the serum in this way, he did not have a single case of tetanus develop, although in our part of the South, there seems to be a great deal of tetanus infection. The cases mentioned included orchotomies, punctured wounds, deep lacerated traumatisms, open joints, etc.

Such evidence as this, and others, no doubt, have had similar experience, is sufficient I think to warrant the continued use of this serum, at least as a prophylactic, but also as a therapeutic agent in those cases where the symptoms have become manifest.

At the same time this, like other biologic products, ought to be standardized before being placed upon the market.

Perhaps the greatest advance in serum therapy in recent years, and one which will leave the most indelible impress over the entire country is the Dorset hog-cholera serum to protect our hogs from the ravages of that fatal and expensive disease. It is to the credit of our National Department of Agriculture that it has so faithfully persevered in its endeavor to ameliorate the condition of our hog-raisers in this direction, although hav-

ing expended a large amount of money in the effort; and our Bureau of Animal Industry, and Dr. Marion Dorset, of the Bio-Chemic Division, in particular, is to be doubly congratulated on the final results achieved in perfecting this immunizing process.

Sufficient work has already been done in various states with the serum to verify the earlier results obtained by the Department of Agriculture; and it is impossible to predict the vast possibilities of our great hog industry brought about by the discovery of this valuable method of protection. An impetus has been given to hog raising in sections of the country where, previously, it had been almost totally in abeyance, or only a secondary branch of farm practice; and it has stimulated the farmers in many localities to improvement in the quality of their animals, which, hitherto, they were indifferent towards on account of the risk of almost total loss from hog-cholera.

It is encouraging, also, to note the almost universal interest that is being manifested in the Dorset serum by the different state authorities. Many of the state legislatures have appropriated funds for the erection and equipment of plants for the preparation of serum for their hog raisers; and in some cases it is difficult to prepare serum fast enough to meet the demand, so many and urgent are the calls for it by the farmers.

Some states distribute the serum free of charge, while others make a charge for it. The writer, with some others, is of the opinion that the former is the more satisfactory, when it can be done. In this way, it is possible to exercise a better control over its use; to place it in the proper hands; and to obtain more accurate records of the results. When a charge is made, some may not care to be at the expense of purchasing it, and so neglect to immunize their hogs, with the result that the disease is permitted to spread from the herds so neglected. In other words, we believe that, with the no-charge method, the maximum number of animals will be immunized; greater discrimination made as to who uses the serum; and the maximum of good results obtained.

We do not know of any similar product at the present time that ought to be more uniformly potent than this serum, as it is outside the sphere of commercialism, and is in the hands of the various state authorities themselves, such as live stock sanitary boards or commissions, experiment stations, etc., who are in the position to test and know its absolute potency before being used upon the farmers' hogs.

Other sera are on the market as commercial commodities, such as antistreptococcic, "antistrangles," canine distemper, etc., all of which appear to be giving more or less satisfactory results, if we are to judge from the records of those who have used them.

As we have already mentioned, the results already obtained from the use of the different therapeutic and immunizing vaccines and sera are sufficient, we think, to suggest a still brighter future for this line of medication in veterinary practice; and the more intimate our knowledge becomes concerning the laws of life, and those abnormal processes which occasion what we term disease, the more rapid will our progress be in the discovery of those biologic products which seem to approximate more closely the processes which nature employs in effecting cures, or, restoring the abnormal to the normal condition. It is most important, however, in order to protect the veterinarian, and the property of the client who employs him, that all of these products should be standardized as to their potency. If this is not done, their efficacy will be minimized; their effect may be either nugatory or dangerous; and the uniformly salutary effect that should follow their administration, which ought to be more or less positive, will always be left in doubt, to the dissatisfaction of everyone concerned in their use.

Dr. D. F. Stevens, Assistant State Veterinarian, Mount Morris, Ill., in renewing his subscription says: "This is my twenty-first year as a subscriber to the Review, and should I continue to practice twenty-one years more, my name will still be on the subscription list."

THE DIAGNOSIS OF GLANDERS BY THE PRECIPITATION REACTION OF KONEW.*

By John R. Mohler, V.M.D., Washington, D. C.

Since the discovery of the glanders bacillus in 1883 by Loeffler and Schutz great progress has been made in the determination of glanders. The greatest difficulty in the recognition of this disease lies in the fact that many glandered horses do not show positive symptoms until the later stages of the disease. Such horses affected with occult or latent glanders, which are apparently not even suspicious cases, must be considered as the principal distributing agents of the infection. The early diagnosis of glanders is therefore one of its most important phases to the practicing veterinarian, and with this definitely established in a stable of horses, subsequent action is clear as to the measures which should be taken to protect the owner from further loss and personal danger. Our knowledge, methods and resources in coming to the conclusion that a given horse is or is not affected with glanders has gradually broadened, until to-day there are at least eight distinct methods by which the diagnosis of glanders may be made, namely:

1. Physical examination.
2. Post-mortem examination.
3. Auto-inoculation.
4. Extirpation of the submaxillary gland.
5. Guinea pig inoculations.
6. Mallein test.
7. Serum agglutination reaction, or this reaction combined with the diversion of the complement.
8. The precipitation test of Konew.

* Presented to the A. V. M. A., San Francisco, September, 1910.

As all of the first seven methods have been fully treated and discussed at former meetings of this association, attention will be directed in this paper only to the precipitation reaction.

This method for the diagnosis of glanders was recently brought to the notice of the bureau in a preliminary report submitted by Dr. D. Konew, Director of the Bacteriological Laboratory in the Veterinary Institute of Charkow, Russia. It is based upon the fact that the precipitins are formed in the bodies of infected animals from the time the infection first occurs, and probably at an earlier period than the other antibodies such as the agglutins, opsonins, etc. However, our knowledge of the development of all these antibodies is extremely meager, owing to the difficulty of discovering them and to the further fact that they exist in minute quantities and are diffused throughout the tissues of the entire body.

Even when the smallest traces of these precipitins are present in the blood serum of glandered horses, Konew states that with a concentrated solution of glanders bacilli he is able to find even these slight traces and thereby obtain a positive reaction to his test. This solution of the glanders micro-organism is prepared by dissolving the growth which occurs on a two-day-old agar culture with an 8 per cent. antiformin solution by using about 10 c. c. of the latter to each agar culture. Antiformin is the patented name of a disinfectant, made by adding sodium hydrate to a solution of sodium hypochloride and is on the market at 60 cents a pint. Its activity seems to be due to an intense oxidation. This solution of antiformin has recently been attracting the attention of those bacteriologists who are interested in sputa examinations, on account of its ability to dissolve various forms of bacteria generally found in the sputum without affecting in any way the bacillus of tuberculosis, thereby permitting the latter to be more readily detected on microscopic examination. It has this same ability to dissolve the bacillus mallei, and in two hours at room temperature the washed culture previously referred to is completely dissolved by the solution of antiformin. If the culture dissolves quite rapidly Konew adds

to this solution another washed culture of greater density in order to obtain as a final result a saturated or concentrated antiformin solution of glanders bacilli. This solution is at first strongly alkaline, but is neutralized by means of a 5 per cent. solution of sulphuric acid. The solution is then filtered, first by ordinary filter paper, and later by the Berkefeld filter, in order that the fluid will be homogeneous without any undissolved bacilli being present. This fluid constitutes the one component part of the precipitation reaction, and as a name to distinguish it from the other soluble albumens Konew has termed it "malleasa," which is analogous to the terms tuberculase, pyocyanase, etc.

According to its discoverer the precipitation reaction is carried out in the following manner: "The blood taken from the jugular of the horse to be examined is collected in a glass container and then allowed to remain at room or incubator temperature. The separated serum which is thus obtained serves as the second necessary fluid for the precipitation reaction. In order to produce the reaction one c.cm. of the malleasa is poured into a glass test tube of 3 to 4 mm. in diameter and 15 cm. long, so that the liquid in the tube is about 3 cm. in height. Then about the same quantity of the blood serum from the suspected horse is taken in a Pasteur pipette which is introduced into the tube containing the malleasa in such a manner that the point of the Pasteur pipette reaches the bottom of the tube. Not until then is the serum allowed to pour very slowly under the malleasa. Inasmuch as the serum has a higher specific gravity it remains on the bottom, while the malleasa is forced up. The free end of the pipette is then covered with the finger and the pipette is carefully taken out, so that the serum is not mixed with the malleasa. Such a mixing should also be avoided during the introduction of the pipette into the serum. The two solutions must only come in contact at one point and then the reaction will be very marked.

In case of a positive reaction, that is when the serum is obtained from a horse affected with glanders, a ring of white

cloudiness develops at the point of contact of the two clear solutions, as a result of the precipitin formation, which is particularly marked in good daylight when the tube is placed in front of a window against some dark object. According to the duration of the disease, the white ring develops at various times and in varying intensity. In severe and chronic cases of glanders the serum produces the ring immediately; in slight affections when the lesions are not very marked in the animal, the precipitation reaction appears only in 5 to 15 minutes." In our experiments the cloudy ring at the point of contact of the two fluids was made to appear more distinct by adding to the malleasa several drops of an aqueous solution of methylene blue for the color contrast. This white cloudy zone is somewhat suggestive of the white ring formed by the presence of albumen in the nitric acid test of urine. (See Figure 1.) After the union of the

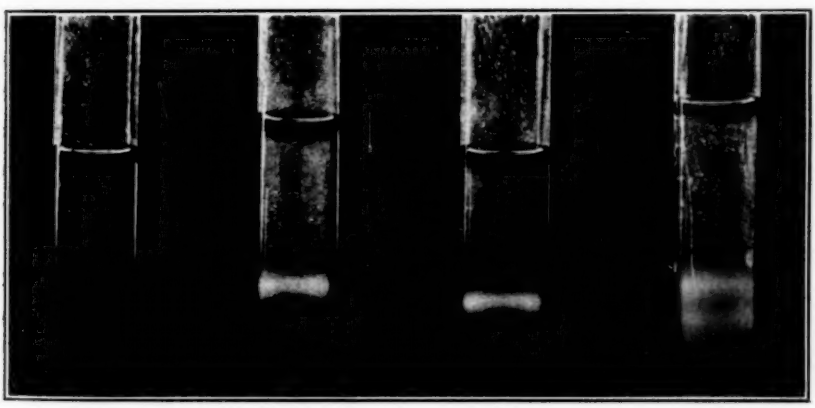


FIG. 1. PRECIPITATION REACTION FOR GLANDERS.

(*a*) Negative reaction; control test made with blood serum of healthy horse.
(*b*) Positive reaction; serum obtained from an occult case of glanders. Note the cloudy ring at the point of contact of the two fluids.
(*c*) Positive reaction; blood serum obtained from case of nasal glanders.
(*d*) Precipitation reaction with serum from horse with chronic farcy.

receptors in the blood serum with the products of bacterial disintegration, further change takes place, which results in a precipitation brought about by a kind of fermentative action. This may be explained in accordance with Ehrlich's theory of the

receptors of the second order. Such receptors possess in addition to the haptophore group, a ferment-producing group called the zymophore group. The receptor seizes the food substance in the bacterial extract with the haptophore group and produces precipitation, manifested by cloudiness, with its ferment-producing group.

The two important factors which make this test a practical one are (1) the very simple technique required and (2) the fluids used in securing the reaction are without danger to the operator, a very great advantage in such diseases as glanders in which the veterinarian in his examination is always subject to the dangers of infection. Konew has applied the test to 150 horses which were simultaneously tested by the agglutination reaction and with mallein. While in most cases the results of the precipitation reaction corresponded with those of the mallein and agglutination tests, at the same time the precipitation reaction had the preference in that it did not give doubtful results; that is, in the cases in which the agglutination reaction appeared in dilutions of 1 to 400 and 1 to 500, the precipitation test gave negative results. On the other hand the precipitation reaction gave clear and positive results in certain cases of glanders in which the lungs and mediastinal glands showed only two or three nodules without involvement of other tissues. As controls on these results he used the serum of horses which were suffering with surgical diseases, some with high temperatures; also of horses which had been injected with anthrax, erysipelas and hog cholera vaccines. In no case was a precipitation reaction obtained, but at the point of contact of the two clear fluids the optical border could be distinctly seen without any cloudiness. Based on these results, Konew drew the following conclusions:

I. By using the concentrated solution of glanders bacilli (malleasa), the precipitation reaction can be applied as a diagnostic method even in the earliest stages of glanders.

II. As a result of the simple technique and the short time required for examination (about one hour), the precipitation reaction should be preferred to any other method of diagnosis.

III. Blood from the horses to be examined should be taken before the injection of mallein.

IV. The solution of malleasa must be titrated in accordance with other standard serums before they are given out in practice, and therefore they should only be prepared in bacteriological laboratories.

Unfortunately the time has been so short since this method for the diagnosis of glanders was first presented that a sufficient opportunity for the careful consideration of its merits has not been presented. However, a number of interesting experiments have been conducted by the bureau with malleasa, although it is not desired to draw any definite or general conclusions from the results.

Recently two cases of farcy came under observation to which the precipitation test was applied and in each case the white cloudy ring was quickly apparent, thereby confirming the diagnosis reached by physical examination. As one of these cases originated in a contractor's stable, the twenty-one horses therein were at once quarantined and subjected to both the mallein test and the precipitation reaction. The latter was made first with the result that the serum of only one horse (Jerry) in the stable gave the white cloudy ring reaction. This horse happened to be the mate to the horse showing lesions of farcy and stood in the stall adjacent to the latter. The following day the mallein test was applied to all the horses, and no reaction occurred with the possible exception of the horse Jerry, which developed a rather atypical local reaction. This animal showed a preliminary temperature of 103.5° and would not have ordinarily been injected owing to the difficulty of interpreting the after temperature in such cases, had it not been desirable for the purpose of controlling the precipitation test. The autopsy on this horse showed four bean-sized nodules of glanders in both lungs, thus confirming the precipitation test. In another instance where nine horses were purchased by the bureau at a sales stable for a different series of experiments, both the mallein and precipitation tests were applied with the result that one horse reacted to the

precipitation test, but showed only a thermal reaction of 102.4° F. without any local swelling, following the mallein injection. This horse likewise showed a few glandered nodules in the lungs and bronchial lymph glands at autopsy. During my present visit in the West the occasion has presented itself in a number of instances to apply this test to exposed or suspected cases of glanders. In all, I have made thirty-one tests with this method both in the field and at the laboratory, and up to this time there has not been an indefinite result recorded. Of these thirty-one animals, five were clinical cases of glanders, one was suspected of being so diseased, three were occult cases proved by post-mortem to be glandered, while the remaining twenty-two were apparently normal.

From the information herein presented, it seems probable that the precipitation reaction will be found to be a satisfactory diagnostic agent for glanders, qualified to do all that has been claimed for it, but the experiments thus far conducted are so few that definite conclusions along this line are withheld pending further investigation of sufficient cases to make a very thorough test.

My sole object in presenting this new method for the diagnosis of glanders to this association is for the purpose of having the test tried out by those veterinarians who have the necessary facilities for making this quite easily applied diagnostic agent. A letter just received from my co-worker, Dr. Stafford, states that since my absence from Washington, he has tested a total of thirty-seven horses. Of these thirteen gave positive reactions to the precipitation test, nine being clinical and four occult cases of glanders as shown by post-mortem examination.

DR. JOHN F. DE VINE, Chief Veterinarian to the Department of Agriculture of New York State, was elected President of the United States Live Stock Sanitary Association at the annual meeting of that grand organization in Chicago, December 5 to 7. We congratulate both the association and the good Doctor.

RETROSPECTION, INTROSPECTION AND PROSPECTION.

By R. A. Archibald, Oakland, Cal.

Sufficient time has elapsed since the meeting of the American Veterinary Medical Association in San Francisco to permit an analysis or short historical review of the results of said meeting, and at the same time perhaps to consider briefly what are and will be the immediate and future effects of same.

With possibly one exception it must be admitted that the meeting was a success more especially from a literary standpoint as the literary program has never been surpassed at any previous meeting in the history of the organization.

The exception to be noted was the attendance and this feature was disappointing, but in a great measure this was counterbalanced by the enthusiasm demonstrated by those who were in attendance. The paucity of numbers was of course due to locating the meeting so far from the center, numerically speaking, of our veterinary population. At the same time we believe that it was certainly a privilege well worth crossing the continent to be able to sit and listen to the various reports of committees, particularly the committee on diseases and on tuberculosis. No more interesting and instructive report has ever been presented to the Association than that submitted by Dr. Rutherford, in which he portrayed in detail what had been accomplished by the International Commission to study methods for control of bovine tuberculosis during the past year.

Dr. Melvin's presidential address revealed the marvelous and material progress that our profession has made and is making. The addresses delivered by Drs. Hughes and Merillat, who graphically presented features for the benefit of the practitioner and the problems pertaining to sanitation which were illuminated by Dr. Mohler and others furnished an intellectual enter-

tainment which we believe was as good as could be produced even in the classic environments of some of our great Eastern cities.

The clinic must also be considered as a success, and the clinic committee aided and directed by Drs. White, Merillat, Blattenberg and others has reason to look back with some degree of pride at an achievement that was absolutely above criticism. The operations were practical, as a general proposition the results were good and all surgery in connection therewith was performed in a humane and scientific manner. In this connection a point of interest was the comparison between Eastern and Western methods of restraint and operative procedure.

From a business standpoint the results of the meeting apparently left nothing to be desired. The secretary's records show a notable addition to our membership roll, totalling some 196 new members, and the many lines laid out to still further increase the roll of membership and to increase the efficiency and importance of the organization all point to a most satisfactory and successful meeting.

The effect upon the standing of the profession on the Pacific Coast has already begun to show material evidence. Some western states are as a result actively engaged in the organization of veterinary societies. In other states the tendency has been for the members of the profession to come closer together, to increase their organization and combine forces for the purpose of working for the common good. It has demonstrated to many who were skeptical that we are on the professional map and has acted as a stimulus towards promoting a feeling of unity to such an extent that events of great importance toward the elevation and advancement of the veterinary profession may be looked for in the near future as the result of such unity.

From the many letters received we have reason to conclude that the efforts of the Entertainment Committee to provide social entertainment were in a great measure successful; and that most, if not all, of our visitors left here with a fraternal feeling and a warm spot in their hearts for the veterinarians on the Pacific slope.

Let us prophetically and with the eye of a seer take a glance at the future and endeavor to foresee what may be the result of this experiment of meeting in the extreme west. We can look into the future and see the greatest and grandest Exposition of all time in full operation in California during the year 1915. This Exposition will be held to celebrate the completion of the gratest and most stupendous engineering feat of modern times, the opening of the Panama Canal. The citizens of this glorious state have already raised sufficient funds in the sum of $17,500,000 to finance this great undertaking. What then is more natural or more likely than that the veterinarians of America, yes of the world, as well as those who are following other vocations, will wend their way westward on that occasion to participate in this great celebration and what would be more natural or more appropriate than that the American Veterinary Medical Association should hold its meeting in California in order that veterinarians could attend both functions at one and the same time.

The fact that the profession in California has demonstrated its ability to care for a convention on such or any other occasion, removes in our opinion the only obstacle towards the consummation of such an event.

We desire at this time with a full realization of what the effort will entail to notify the veterinary profession of America, that when the proper time comes, the members of the veterinary profession in California will issue an invitation to the American Veterinary Medical Association to meet again on the Pacific Coast in 1915.

We take pleasure in presenting below the strong commission appointed by President Glover, of the A. V. M. A.:

INTERNATIONAL COMMISSION FOR THE STUDY OF METHODS OF CONTROL OF BOVINE TUBERCULOSIS.

J. G. Rutherford, Chairman; Veranus A. Moore, E. C. Schroeder, W. D. Hoard, Frederick Torrance, John R. Hurty, J. W. Tomlinson, W. C. Edwards, C. A. Hodgetts, John R. Mohler, J. W. Flavelle, Mazyck P. Ravenel, Joseph M. Cudahy, M. H. Reynolds, Secretary.

IMMUNIZATION OF CATTLE AGAINST TUBERCULOSIS.

By Dr. Wilfred Lellmann, Professor of the New York University.

In an article of the November issue of the American Veterinary Review, Drs. Schroeder and Mohler, of the Bureau of Animal Industry, published their results and ideas of different methods of immunizing cattle against tuberculosis, and drew therefrom the conclusions as to the usefulness or uselessness of the various methods. Amongst others, they claim also the research of bovo-vaccination, according to the method of von Behring. This claim, to judge from their own description, is neither exact nor correct, and is capable of producing a wrong impression upon professional men who are but superficially familiar with von Behring's method. In the first place, "bovovaccination" is a term introduced by von Behring, which means vaccinating cattle with Bovovaccine, a vaccine especially prepared at the Behringwerk. It consists of tubercle bacilli of the human type which have been attenuated by special method and process, and which were originally obtained from one culture, in order to get a vaccine of a most uniform quality. Furthermore, it is not correct to use the term "bovovaccination" in connection with immunizing cattle against tuberculosis, but with von Behring's Bovovaccine, just as well as tauromanization is generally accepted as immunizing cattle with Tauruman against tuberculosis. The mere intravenous injection with a vaccine containing tubercle bacilli of the human type does not justify the statement or the claim of having used the method of bovovaccination of von Behring. It is not the method of intravenous injection which claims any originality, but it is the preparation of the vaccine itself. Of course, nobody can be prohibited from using the term "bovovaccination" in literature, as it might simply mean vaccinating cattle. However, any well-read man ought to know that this

term was only introduced by von Behring and applying solely to his method, and any other use of the term must be considered a misrepresentation. For this reason I feel that I have to answer the article of Drs. Schroeder and Mohler in this regard, as I have done some research work according to the original von Behring method myself, with the Bovovaccine prepared at the Behringwerk, for six years past. Furthermore, I disagree as to the usefulness and uselessness of this method in vaccinating young cattle in practice. It certainly requires a systematic way in going about bovovaccination, combined with sanitary conditions, without which no infectious or contagious disease could be successfully combated. I feel safe in stating that bovovaccination, according to von Behring's method, combined with strict sanitary principles, *i. e.,* the best available, will accomplish in time a considerable decrease of tuberculosis amongst cattle. It is not my intention to recapitulate all the different ways in going about this systematically. Every practitioner who has interest in bovovaccination can amply inform himself about sanitary methods of Ostertag and Bang, which in several regards could perhaps be modified as to render them valuable and practicable, together with a systematic and continuous bovovaccination of cattle and their progeny. Thus the resistance against tuberculosis could be strengthened by degrees and the percentage of loss gradually cut down to a very low margin.

An important notice appears on page 544!

THE COLORADO VETERINARY MEDICAL ASSOCIATION will meet in Denver January 20, holding their annual banquet in the evening. Arrangements are being made with the local (Denver) meat inspection force for a pathological exhibit for the Meat Inspection Class of the Division of Veterinary Science of the Colorado Agricultural College to be given in the forenoon of the 20th just before the state association meeting. The practitioners of the state are invited to join the Meat Inspection Class of the college in attending this exhibit. The Live Stock Show of Denver will be held during this week.

REPORTS OF CASES.

CASTRATION OF CRYPTORCHIDS.*

By A. W. WHITEHOUSE, V.S., D.V.S., Walden, Colo.

I have never been satisfied with the operation via the inguinal canal. Probably my technique is deficient, but in a large number of cases I have never succeeded in the prescribed hooking of the testicle with two fingers, and have always had to insert my whole hand. Nor have I in this operation received any aid from the gubernaculum; probably because the hand is too close to it while breaking in. In nearly every case I have had to push aside one or two folds of intestine before reaching the testicle. My experience has usually been that the packing has been insufficient. I have had to relieve inclusions of intestine per rectum, cast again and repack with one hand in the rectum, trusting to the owner or some bystander with partly disinfected hands to stitch the packing in the scrotum. I have tried no packing at all, with the result of immediate descent of the intestines. There has always been copious suppuration and a slow recovery with a death rate of about 25 per cent.

In one case I have pushed the sheath to one side and incised the prepubian tendon not far from the middle line. This case recovered nicely but slowly, owing to the copious escape of peritoneal fluid. In any case the scrotum is the hardest part of the body to disinfect thoroughly, and a horse tied in the ridgling position is almost impossible to keep clean during the operation, and can only be dressed perfunctorily during the healing stages.

Moreover, while a natural inguinal hernia is bad enough, an artificial one is far worse.

The operation through the high flank is probably a very old one, but seems to have been entirely discarded by veterinarians. My excuses for attempting to revive it have been, first, the extensive use of the operation many years ago by an empiric on the Laramie plains with no very severe death rate in spite of

* Read before the annual meeting M. V. V. A., Omaha, July, 1910.

septic methods; and, secondly, my own familiarity with a similar technique and absolute success (no deaths in 900 head) in spaying heifers.

It is only to gratify the insatiable maw of Dr. Kaupp that I am reporting at this early date, as two were operated on on June 2 and one on June 15, and none of the wounds are completely healed. For comparison I am also reporting on one operation done on June 2 via the inguinal canal.

No. 1.—June 2, 1910. Inguinal canal. Gray gelding 3 years old. Cast in ordinary castrating position. Scar recognized on left side. On right side a small body detected with difficulty, supposed to be a testicle. Cut down on, proved to be an enlarged lymphatic gland. Determined on the old operation and disinfected with some thoroughness. Breaking in, found the testicle about 4 inches from the abdominal wall, but was able to bring easily to the surface and remove with the emasculator. Packed with gauze (boiled and soaked in 2 per cent. creolin), stitched scrotum and allowed to rise. There was immediate evidence of acute abdominal pain. Gave morphine sulphate gr. iii. subcutaneously. Rectal exploration failed to find inclusion of intestine or to relieve the pain. Spent about an hour trying to apply a pressure pad externally, the pain steadily increasing. Cast the colt again, when the pain was at once relieved. Arranged to pack with one hand in the rectum, the owner disinfecting his hands to do the stitching. For some reason, probably being rattled, inserted the right hand in the rectum instead of the left and had to withdraw and disinfect in a hurry. Then succeeded in packing satisfactorily with sterile gauze bandages. Allowed the colt to rise, when the evidence of pain was much less. Gave 100,000,000 anti-suppurative, and to this injection alone I attribute the recovery of the colt. There was dull pain till 36 hours later, when the packing was removed, and though there was great swelling and stiffness, there was hardly any suppuration, and on June 19 the colt had practically recovered. He lost a good deal of flesh and was off his feed for four days. Nos. 2, 3 and 4 were operated on by practically the same method; the details, which are not yet by any means perfected, varying very little. With 2 and 3 an injection of 100,000,000 anti-suppurative was given at the time of operation; with 4, the night before. No difference seems to arise from this procedure. Nos. 2 and 4 were given 2 oz. chloral hydrate ball per rectum about 2 hours before the administration of chloroform; the advantage being that they were cast with less

struggling. There was no saving on chloroform and they were more helpless and violent in coming out of the chloroform than No. 3, who was chloroformed only.

No. 2 was first cast with an ordinary castrating tie for inspection of the scar, and allowed to rise. No. 3 was said by the owner to have two scars and was not inspected at all, but was operated on on the left side (the testicle proving to be on the right), and No. 4, being gentle, was inspected in the standing position.

In Nos. 2 and 3 the operative area was not prepared beforehand; in No. 4 the flank was copiously anointed with 5 per cent. carbolized vaseline overnight. No advantage has appeared to attach to this procedure.

The instruments (excepting the knives), cloths and silk sutures were boiled for fifteen minutes and then about 3 per cent. carbolic was added to the water. The knives stood fifteen minutes in 95 per cent. carbolic and were then added to the other instruments; the catgut was merely soaked in 5 per cent. carbolic.

The horse was cast in the stable (to avoid wind) with the operation area uppermost, the English hobbles being used; he was then profoundly anæsthetized and a liberal area shaved from the point of the ilium to the fold of the flank about eight inches wide in transverse diameter. The upper hind leg was released from the hobble and drawn backward. The shaved area was scrubbed for some minutes with soap water and 3 per cent. creolin, and the whole side moistened with the same solution. Next the shaved area was dried with alcohol and painted with tincture of iodine. A cloth about 1 yard square was wrung out from the antiseptic solution and laid over the field of operation. (Later, before suturing, two other cloths were laid on the quarter and ribs to protect the end of the thread.) An incision about six inches long was made in the cloth and through this the operation was performed. The fold of the flank was grasped firmly in the left hand, tensing the skin, the operator leaning over the horse's loin, and the skin divided for about five inches in a vertical direction. The seat is slightly forward of the furrow where the hair goes in two directions and begins about three inches above the fold of the flank, reaching to within three inches of the external angle of the ilium. The cloth was then pinned to the edges of the wound with about a dozen tenacula and artery forceps. The loose connective tissue was divided with great care, the hæmorrhage controlled and the aponeurosis of the external oblique exposed. A division of about

one inch in length was made between the fibres with the knife and this was extended with the fingers as far as possible. Then with the hand in a cone shape, right if working on the left side, and vice versa, the abdominal wall was penetrated and the peritoneum ruptured. The internal ring is about four inches from the wound and the gubernaculum is easily followed and the testicle brought to the surface. In No. 3 in which I operated on the wrong side, I found the testicle before reaching the lower ring, but do not believe that there would be any difficulty in reaching it in a well-starved horse. Following my spaying procedure, but using more stitches, I united the aponeurosis of the external oblique with two catgut sutures, and the skin with five or six silk, all interrupted.

Not one of the three horses showed any pain, general disturbance, or loss of appetite. There was copious escape of peritoneal fluid from the wound, considerable abdominal œdema, and in all cases suppuration of the skin wound. The wounds were dusted with boric acid and a little absorbent cotton allowed to dry on over the stitches, the surrounding area being tarred.

With proper antisepsis and the use of antisuppurative vaccine, and especially with general anæsthesia in a covered building, I believe there is no fear of general infection. In my future cases I intend to suture the peritoneum and the deep muscles to prevent the escape of serum, and I must find some more efficient method of disinfecting the deep layers of the skin. A bichloride pack for twenty-four hours is applicable to gentle horses, but what to do with unbroken ones is at present beyond me.

A VERY UNUSUAL CASE OF OESOPHAGEAL OBSTRUCTION IN A HORSE—OPERATION—RECOVERY.

By L. A. MERILLAT, Professor of Surgery in the Chicago Veterinary College.

The subject is a bay work horse, six years old, weighing 1,500 pounds and in splendid physical condition. When presented for treatment was reported to have been unable to eat or drink for forty-eight hours, although constantly attempting to do so. The examination revealed no systemic disturbance, no soreness of the throat, and no swelling or bulging to account for the absolute inability to drink even a single swallow of water. In attempting to drink, the very first swallow would be immediately re-

jected through the mouth and nose and unlike a case of sore throat there was no attempt to take two or more consecutive swallows; on the contrary, some moments always elapsed between each attempt to satisfy the thirst. The solid food given for the purpose of making observations was handled in about the same manner; a mouthful would be picked up, masticated, and then promptly rejected chiefly through the mouth. There was no ptyalism, no retching, no champing of the jaws, no movements of the cervical portion of the oesophagus to indicate that the patient was choked, and palpation of the throat and the neck revealed nothing unusual, nothing abnormal. The countenance, however, indicated dire distress.

DIAGNOSIS.—After some hours fruitless effort to arrive at any positive conclusions as to the nature of the condition at hand, an attempt was made to pass a stomach tube first by way of the nasal cavities and then by way of the mouth. In each case the tube met a formidable obstruction in the region of the pharynx, but as there was no dyspnœa to indicate foreign body in the pharynx, and as nothing could be felt in the upper part of the oesophagus, it was thought that the tube might be blocked by spasmodic contractions of the oesophagus. The patient is then placed upon the operating table and chloroform administered. In the state of anæsthesia and with the neck fully extended, the probang (consisting of a stomach tube and stilette) when passed through the mouth into the oesophageal infundibulum could be seen to be pushing an indistinct object toward the surface of the neck at the level of the larynx, but no amount of pushing could dislodge it in a downward direction. A five-inch incision was then made down the neck beginning at the bifurcation of the jugular in order that the hand might be admitted directly to the object. Direct palpation of the object through the walls of the oesophagus now showed it to be the size of a hen's egg, firm in consistency but compressible. It was now plain that the patient was choked with a wad of hay at a very unusual location. The end of the stomach tube then removed brought out no food particles, but emitted a fetid odor, showing that gangrene of the oesophagus, the inevitable termination of prolonged chokes, was already present.

OPERATION.—The patient was first carried into profound anæsthesia, and then the mouth was forced open as far as possible with the mouth speculum. The left hand was passed into the pharynx through the fauces, which, on account of the deep

anæsthesia was not difficult to do. The object was grasped through the incision with the right hand and by squeezing upon it, it was forced with some difficulty into the palm of the left hand within. Upon being withdrawn, the object was found to be a wad of alfalfa and molasses compressed into a perfectly dry mass the size and shape of a hen's egg. Its surface was streaked with blood and emitted a very fetid odor. The wound was wiped out with tincture of iodine and with the exception of an orifice for drainage was closed up with interrupted sutures, and packed with gauze.

AFTER CARE.—Liquid diet, of which the patient partook very readily, for five days, careful feeding for two weeks, and strict attention to the surgical wound which healed without serious reaction, restored this unusual surgical subject to perfect health in four weeks.

CANINE LYMPHATIC LEUKEMIA.

By A. T. KINSLEY, M.Sc., D.V.S., Pathologist Kansas City Veterinary College.

Lymphatic Leukemia is not a common disease of domestic animals. It is more frequent in the dog and ox than in the other

From photograph showing extreme emaciation, roughness of coat and enlargement of submaxilliary lymph node.

domestic animals. Twenty-one cases were reported in the Berlin clinic from 1886 to 1894 from a total number of 70,000 dog patients in that clinic during that time. A case of Lymphatic

From photograph of spleen of above dog, showing leukemic nodules.

Leukemia was reported by the writer in the AMERICAN VETERINARY REVIEW, Volume XXX., page 436; another case was reported in the *Kansas City Veterinary College Bulletin*, No. 29. On June 20, 1910, Dr. J. C. Flynn, of Kansas City, Mo., presented a dog at the Kansas City Veterinary College clinic that was of considerable interest, probably because it was an unusual case. On a casual examination of the dog it was thought

that he was affected with tuberculosis. This probable diagnosis was based on the appearance of the dog, which, as is shown in the accompanying illustration, was very much emaciated and showed enlargement of the superficial lymph nodes, and had a general dejected appearance that is common in the later stages of tuberculosis. There was also more or less disturbance of the digestive and circulatory organs. Unfortunately no hematologic study was obtained of this patient because of the fact that he died soon after being presented at the clinic. A careful autopsy revealed that practically all of the lymph nodes were enlarged, more or less hyperplastic, and in some cases there was central necrosis. The spleen contained several leukemic nodules as shown in the accompanying illustration. These nodules were composed of lymphoid cells. There were several small leukemic infarcts in the liver and kidneys which were found on microscopic examination to be lymphoid cells. The red marrow was slightly discolored and of a semi-gelatinous consistency.

"ALFALFA CLOG."

By Dr. J. L. HOYLMAN, Assistant State Veterinarian, Franklin, Neb.

The description of the following case would apply to a great number that have come under the observation of the writer.

A large gelding in good condition had been working every day. I was called to see this horse June 24, 1910. Owner said his water was bothering him, as he had treated him for the same trouble before; but on arriving I found him eating hay as though nothing was the matter; the owner still insisting it was his water. Luckily, the horse urinated while we were talking, and after he did so, had one of those severe cramping spells, which would last from twenty to thirty minutes, rolling continually; after which he would get up and eat hay for nearly half an hour, apparently all right. I inquired as to the kind of feed the horse had been having and he said he had been feeding prairie or wild hay, but had run out of it and had fed alfalfa hay for a week. I at once suspected the trouble and made a rectal examination. Could feel a large mass of hard material in the posterior part of the great colon, but none had worked far enough back into the rectum so that I could remove it.

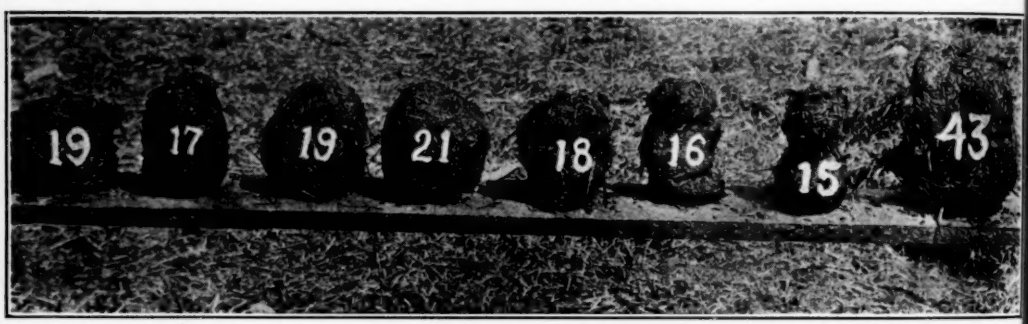
TREATMENT.

First Day—I gave a physic ball and raw linseed oil in quart doses every three hours until one gallon had been given; injections per rectum every hour, and Fl. Ex. Nux Vomica, ℥ii; Spts. Ammo. Arom., ℥i; Ac. Salicylici, ℥ii, as a dose to be given every three hours.

Second Day—Fl. Ex. Nux Vomica, ℥i; Spts. Ammo. Arom., ℥i; Ac. Salicylici, ℥ss, as a dose every three hours, with rectal injections every hour.

Third Day—Arecolin, grs. i-ss hypodermically in the morning and Eserine, grs. i-ss hypodermically in the afternoon.

This caused the horse to do a great deal of straining. I made another rectal examination but still nothing was within reach.



The figures on each ball denote the inches in circumference at the point where the figures appear.

After this the horse began to bloat and was tapped at 9 p. m. He died the next morning. I will say here I have always been very successful with this mode of treatment, where the "clogs" have not been too large to be forced back in the floating colon or rectum where they could be reached by the hand.

On post mortem I found eight of those balls, some of them nearly round; and No. 17 was lodged in the floating colon about four feet from the rectum, No. 19 next, and then No. 21. Great effort was put forth to expel the "clog" and in doing so No. 17 had been moved about six inches; but it had become so dry and filled the lumen of the bowel so tightly that the inner coat of the bowel had stuck to the ball and was carried along with it the full distance it had moved. The rest of the balls were found in the large colon. The remaining material in the bowels was a

very soft mass caused by the physic that had been given. The balls were coated with a kind of a mucous coat which the physic seemed to have no effect on.

I find this "alfalfa clog" trouble in old horses, where teeth are poor and the alfalfa is not properly masticated; also in colts where they are shedding their teeth, from three to four years old.

TREATMENT OF PURPURA HEMORRHAGICA WITH STREPTOLYTIC SERUM.

By JAMES J. JOY, Detroit, Mich.

During the past six months I have treated in the neighborhood of thirty cases of purpura, and in all of them have used Streptolytic Serum. I have had far better success than with any of the old line treatments. Not only have I had quicker and cleaner recoveries, but saved the attendant and also myself a great deal of work and worry. This is not my first experience with serums in this disease, for I have used them for some years, but with very unfavorable results in a great many cases; but I am pleased to say that in all the cases treated by me during the time that I have used Streptolytic Serum I have not been disappointed in one case. Previous to the use of this serum I have been obliged to perform tracheotomy in a great many cases to keep my patient alive. In all my cases since using it I have not had occasion to perform it once. I enclose with this communication a short history of three cases.

Case No. 1.—Bay horse, 1,100 pounds; seen by me for the first time September 6, 1910. At that time showed very marked symptoms of purpura. Edematous condition of the limbs, abdomen and head; very stiff and could scarcely be moved. Had shown no signs of "pink-eye" or any "shipping fever." September 7, p. m., greatly improved, edema gradually disappearing, and on September 12 all traces of affection had disappeared.

Case No. 2.—Black gelding, 950 pounds; seen by me September 28, a. m. Owner said he had just recovered from "shipping fever" about a week before. Edema very well marked, breathing quite labored, appetite quite impaired and had no desire for water. Gave 30 c. c. serum. Condition much improved, but on September 30, gave 20 c. c. serum. Continued to improve and was in use October 5.

Case No. 3.—Bay mare, 1,200 pounds; seen first on October 30. A typical case of purpura. Edema of head and limbs very marked. Breathing labored and could scarcely be moved. Received 50 c. c. serum. Improvement from the 31st of October was very rapid, and on November 5 was in condition to be used. I will state regarding the cases mentioned as in all the others treated by me, that with the exception of few doses of iron tonic, no other medicines were used. I have made up my mind from experiments that one full dose, or about 50 c. c., will give better results to the practitioner than repeated small doses.

AN INTERESTING CONDITION.

By WARREN L. THAYER, D.V.S., Worcester, Mass.

Following is the description and breeding of a heifer calf, the picture of which I mail to you under separate cover. This

is a four-weeks-old calf, black and white in color. The sire was a registered Ayrshire; dam was a three-quarters Ayrshire and

one-quarter Jersey. The queer feature about this calf is that the white on her is very straight hair, while the black is a very coarse wool with the texture of wire. The hair on legs is straight; on tail, coarse black wool, except at the tip, which is finished with a tuft of straight white soft hair; each of the ears are nicked with a very distinct V, as may be plainly seen in the photo.

The mother of this calf was pastured in a field which was directly across the road from a family of colored people; their children have used this pasture all summer as a playground. What we wish to know is, have these children anything to do with the condition of this calf's coat?

DR. L. FREDENBURG, of Council Grove, Kansas, says: "Enclosed find check for $3 in payment of my subscription to 1912. Thanking you for the help you have given a lonely country practitioner in the past, I remain, etc."

BUFFALO HERDS.

The government now owns three herds of buffalo: The Montana herd of 47, the Wichita herd of 19 and the Yellowstone herd of 95. The American Bison Society, which has been trying to save the bison from extinction, has just taken a census of the breed, announces that there are 2,108 animals in North America, and that this shows a steady increase and that the danger of the animals becoming extinct seems to have passed.—*The Live Stock Journal.*

INOCULATED PIGS DID WELL.

At Omaha last Saturday a bunch of eighteen pigs, averaging 155 pounds, sold at $8.50 per cwt. A history attaches to them. July 28, at an average of thirty-five pounds, they were inoculated and turned in with a lot of sick pigs at the Omaha yards, where experts kept them under close scrutiny for six weeks. During that period all the uninoculated pigs died, but all the healthy, inoculated stock went through the test and was put on feed, doing well until sold. The demonstration was an unqualified success from start to finish and the fact that the inoculated pigs, after being exposed to cholera in its most virulent form for six weeks, showed no symptom and continued to thrive while going through a fattening process ought to be sufficient to satisfy the most skeptical of the efficacy of this method of treatment.—*Breeder's Gazette.*

ARMY VETERINARY DEPARTMENT.

INSUFFICIENT PAY FOR VETERINARIANS OF THE QUARTERMASTER'S DEPARTMENT.

The *Army and Navy Register* of December 8 says:

The quartermaster general of the Army, in his annual report of the operations of the quartermaster's department for the fiscal year ended June 30, 1910, says, among other things:

Veterinarians.—Great difficulty has been experienced in securing competent veterinarians at the compensation of $1,200 per annum fixed by law, without chance of promotion.

Veterinarians in the cavalry and field artillery receive on entrance into the service the pay of second lieutenants, with allowances of quarters, fuel, and light authorized by law to officers of that grade. The entrance salary of veterinary inspectors, Bureau of Animal Industry, Department of Agriculture, is $1,400 per annum, with chances for promotion and increase. Under these circumstances, it is not likely that men qualified by education, training and experience to fulfill the duties of veterinarians for the quartermaster's department, which differ in no respect from those expected of veterinarians in the cavalry and field artillery service can be secured at the compensation allowed to them by law.

It is recommended that measures be taken to invite the attention of Congress to this anomaly, and that the law limiting the pay of veterinarians in the quartermaster's department to $1,200 per annum be modified.

REMARKS.—As this item has made its way into the daily press in a corrupted form, we wish to state, what is not generally known, that the army has two different classes of veterinarians. Those *appointed* to the cavalry and field artillery regiments, after passing a severe entrance examination, have a fixed military status and draw the pay and allowances of second lieutenants with increase of pay after each five years of additional service. The veterinarians *employed* by the Quartermaster's Department have no military status but are considered civilians because engaged by contract as needed at $100 per month, and if no longer needed, they are discharged. Their number is not fixed by law, but during the Philippine insurrection, 1899-1902, there were over sixty of them employed in the Philippines alone. For years they were not examined as to their professional fitness, and many of those so employed were not graduated veterinarians. Continuous complaints of their incompetency led the present Quartermaster General to demand of them a civil service exam-

ination, which, although not severe, at least prevents non-professional men from getting into this department of the army. Their pay is surely insufficient for a college graduate, but their social status is yet worse, so that young veterinarians of good education and breeding who happen to be attracted by the advertisements, leave the position as soon as practicable after becoming acquainted with its iniquities.

But the whole and real trouble is that there ought to be no such civilian contract veterinarians in our army in time of peace. Their usefulness and application are limited by their civilian status in a military organization. At this point we disagree with the Quartermaster General when he states "that the duties of veterinarians of the Quartermaster's Department differ in no respect from those expected of veterinarians in the cavalry and field artillery service." They differ materially. The Quartermaster veterinarian attends to the ordinary veterinary practice only, assisted by civilian blacksmiths, teamsters and packers, while the veterinarians of cavalry and field artillery control in a military manner the farriers and horseshoers, are in charge of the administration of veterinary hospitals, and, above all, act periodically as instructors in hippology to officers and instruct daily farriers and horseshoers. This fact does not reduce the value of the Quartermaster veterinarian, but rather enhances the value of the veterinarian of cavalry and artillery.

Naturally, then, the cavalry and field artillery need capable, commissioned veterinarians most, but the Quartermaster Department, with its valuable mule-stock and its newly installed remount depots, the engineer companies, the signal-corps companies, the army service schools, all need commissioned veterinarians badly; and yet they are not provided for. Just now, when the proposed aerial corps detracts the attention of otherwise prudent and conservative military men from necessary improvements in the old established and reliable branches of the service, of which the veterinary service is one, no one can tell how long it will take our army to possess a properly organized army veterinary corps such as all civilized armies maintain since the time of the great Napoleon. No such corps is in sight in our army at present, which necessitates the piecemeal legislation as recommended above by the Quartermaster General, who, as is well known, fully appreciates the services of competent veterinarians for the army generally.

O. S.

ARMY VETERINARY NEWS.

A board of officers, consisting of two cavalry officers and veterinarians Plummer and Jewell, has been appointed to meet at Fort Riley, Kansas, to revise the veterinary supply table of February 2, 1902. The board has sent a circular letter to all army veterinarians stationed in the States, submitting several questions regarding the improvement of the medicine table and of veterinary equipments for field service. It is hoped that material improvements will be recommended by the board, not only in the supply of more up-to-date medicines, dressings and equipments, but that also the question of technical veterinary advancement by means of periodical courses for army veterinarians will be brought to the attention of the military authorities.

The Cavalry Equipment Board, now meeting at Rock Island Arsenal, Ill., has requested reports of several army veterinarians about the best means to transport the necessary veterinary medicines and instruments for veterinarians and farriers for emergency treatment in the field. The board thinks that no farriers', horseshoers' and saddlers' supplies should be carried on the horse ridden by any of the soldiers mentioned.

The inquiries indicate that the board is on the right track to solve problems that have baffled the best intents and purposes of army veterinarians and of officers of cavalry in general. The field artillery and other driving organizations are not too pressed for transportation of these supplies.

THE MISSOURI VALLEY VETERINARY ASSOCIATION will hold its mid-winter meeting in Kansas City, January 24th, 25th and 26th. This meeting should be a record breaker in all respects. The program is surely sufficiently attractive and, being held in one of the greatest cities of the Middle West, there is nothing wanting to insure a large attendance. Two days will be devoted to the presentation and discussion of the many splendid papers that have been prepared. The third day will be devoted exclusively to a clinic and practical demonstrations. This will include a demonstration of the preparation of anti-rabic vaccine, with a discussion of the same, by a Pasteur Institute representative, Dr. Nisbet, and a demonstration of intradermal reaction of tuberculosis in the skin, at the root of the tail of a bovine, with a discussion. Also a discussion of hog cholera serum treatment, demonstrating certain phases not covered last year.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. Liautard, M.D., V.M.

Caustic Action of Carbolic Acid [*Hy. Taylor, F.R.C.V.S.*].—Liquid carbolic acid had become crystallized in the bottle, where it was. The bottle was placed in the cow-byre over one of the cows, with the supposition that the heat of the place would melt it again. The bottle was laid on its side and the cork left slightly loose. As expected, the acid thawed out. It dropped on one cow, giving rise to an extensive eschar, which in a few days became hard, leathery and when sloughing out left a large granulating sore extending from the external angle of the ilium to the hock and spreading according to an illustration that accompanies the description of the case, from the stifle to nearly half the width of the lower ischio-tibial region.—(*Veter. Record.*)

Foreign Body in the Heart of a Calf [*Wm. Moodie, M.R.C.V.S.*].—The animal has never shown any signs of illness during its life, and it was only at the slaughter house that the lesions were found. In the left ventricle there was imbedded in the thickness of the myocardium a piece of wire two inches long and hooked at one end by a bent part which measured ¾-inch in length. The calf was seven weeks old. There was no inflammation of the pericardium nor endocardium nor of the fleshy substance of the heart. Externally and internally the whole organ seemed perfectly healthy.—(*Veter, Journ.*)

Post Partum Tetanus in a Cow [*Norman Meyers, L.V.S.*].—This cow had calved several days before, and during the next twenty-four hours everything went satisfactorily with her. Then she showed sickness, had her uterus irrigated with garden hose, received lots of home remedies and then presented tetanic symptoms at the head and neck. Careful examination failed to discover any external wound. Perhaps the garden hose had

been the germ carrier to some wound of the genitals during parturition. If this was correct the incubation would have been in this case from 24 to 36 hours. The animal received no treatment.—(*Veter. Journ.*)

Poll-Evil [*W. Cargill Patrick, F.R.C.V.S.*].—Resulting from a bad fall, a six-year-old mare had a swelling at the poll of the head. Treated with cold applications, blisters and finally by the opening of an abscess, disclosing new growth of bone on the atlas. The case did well for a while. Then the mare had some difficulty in moving about in her box. She had marked loss of co-ordination in her actions and then a slight enlargement was noticed over the right side of the atlas. Suspecting spinal cord complications, the mare was slaughtered. At the autopsy, the atlas was found with a large osteophyte overhanging the neural canal to some extent. "The right wing was thickened, the articular surfaces of that side more or less constricted and a distinct gutter extending from the anterior foramen to the posterior was present, the latter being entirely absent. The unnamed foramen of the wing of the atlas was nearly four times larger than normal."—(*Veter. Journal.*)

Fracture of the Fourth Cervical Vertebrae [*A. W. N. Swanson, M.R.C.V.S.*].—The animal had colic and was relieved by ordinary treatment. Once during the attacks, he had reared and fallen backwards on its poll. The next day he seemed very uncomfortable and if any one came into his box he invariably turned away towards a corner. Then he had fits, turning round and round in circles, always from the right to the left. A painful swelling appeared on the right side of the neck. The fits increased and in them the horse seemed to get its neck twisted to the left and was unable to get it back in position. Yet when he succeeded in doing so, then the fit would pass off. One morning he is found unable to get up and he dies. At the post mortem a fracture of the left transverse process, through its entire length with the posterior portion of the right process of the fourth cervical vertebræ were found. The horse lived twelve days with such lesions.—(*Ibidem.*)

Torsion of the Stomach in a Dog [*John L. Perry, M.R.C.V.S.*].—A dog is reported sick. He is believed to have been poisoned. The owner has given him an emetic of salt and water

and the dog makes constant attempts to vomit. He dribbles at the mouth and throws out gases. The abdomen was hard, tense and painful. Morphia and hypos. Sodæ are administered. While under the influence of the morphia a probang is passed and some obstruction met with at the stomach end of the oesophagus. Tympanitis and pains increase. Gases from the stomach are evacuated by puncture with the trocar. Dog died. Post Mortem.—Stomach twisted on its superior attachment from left to right—a half turn. The whole organ was dark claret color and gorged with blood. It contained a pint of solid and liquid. The hole made by the trocar was found in the right side of the organ."—(*Ibidem.*)

PARASITIC GASTRITIS IN A MARE [*E. Wallis Hoare, F.R.C.V.S.*].—Ten-year-old thoroughbred mare commenced to fail in condition and has capricious appetite. She soon gets in a wretched state, anemic, hide-bound, with a dry scaly affection of the skin of the back and thorax. Various treatments were tried, but all without results. She at times showed uneasiness when swallowing her food. After four months of treatment she was destroyed. At the autopsy the stomach was found much contracted and its walls very thick. The villous portion of the organ showed a number of corrugations, whose raised portions were white in color and the depressed parts of a dark red. Among the ingesta were a number of blood clots partially digested. The case was pronounced one of parasitic gastritis. The parasite present belong to the species *Strongylus Gracilis.*—(*Veter. Record.*)

ACUTE LAMINITIS TREATED SUCCESSFULLY WITH ADRENALINE [*Vet. Capt., C. H. Jolliffe, F.R.C.V.S.*].—The first case relates to a four-year-old gelding, which was in observation for urticaria, and had had a fall during exercise. He became very lame, was put in slings, struggled against them, and was found one morning with all the symptoms of a severe attack of acute laminitis of all four feet with complete impossibility to move or stand up. One c. c. of a 1 in 1,000 adrenaline solution was injected in the digital arteries of both fore legs. A 6-drachm ball of aloes was also administered. The next day the horse was standing and showed a slight improvement. Two c. c. of a 1 in 2,000 adrenaline solution were injected on each side in all four limbs, while the horse was lying down. The following morning

the horse was found standing up and moving freely. Purgative acting. For two successive days the improvement became more marked, but as there remained some soreness all round, 2 c. c. of adrenaline solution 1 in 1,050 were injected in each side of all four fetlocks. The general action of the horse continued to improve and the animal resumed work in a short time.

The second case was that of a black gelding which had laminitis of both fore feet. Shoes were taken off, feet poulticed and purgative administered. As instead of improving, the disease seemed to increase; 4 c. c. of a 1 in 2,000 adrenaline solution were injected on each side of both fore fetlocks The second day after, improvement was manifested and continued to progress satisfactorily, so that in a week the animal could trot, being only slightly lame. He resumed his work a few days after.—(*Veter. News.*)

INFECTIOUS JAUNDICE IN DOGS [*E. Wallis Hoare, F.R.C.V. S.*].—No matter what may be the true nature of this affection, a peculiar complication of the disease is the occurrence of invagination of the intestines, which is indeed frequently observed. The author relates the history of two cases that came under his notice recently. Two fox hound pups, three months old, in fine condition were brought to him for treatment. Both had the characteristic yellow color of the skin and of the mucous membranes. Milk and lime water with one-tenth of a grain of calomel were prescribed. Both dogs improved, but died suddenly, one in one evening and the other during the night of the same day. At the autopsy of one there was found an invagination of the ileum, nearly one foot in length and in the other a similar lesion only six inches long. The liver in both showed various shades of yellow, was more or less friable. In neither of these dogs during life had any symptoms of invagination been manifested. No vomiting, no straining, no evidence of abdominal pains.—(*Veter Record.*)

HERMAPHRODITISM IN OSTRICH [*Stanley Elley, M.R.C.V. S.*].—In April the author was requested to castrate about a dozen cock birds, which it was intended to use later as foster parents for young chicks. The birds were in the kraal, to all appearance fully grown male birds, with feathers of from four to five months' growth. They were in good condition, some being red-legged. The first two birds were operated upon successfully

and the third bird was chloroformed. But after making the incision and attempting to locate the right testicle, no trace of it could be found. It was said that all the birds were between seven and ten years old, so that the generative organs should be fully developed. Failing to find the right testicle, the writer broke through the fold of peritoneum, which normally separates the two testicles, and endeavored to locate the left one, but in place of a testicle he found what felt like a small ovary. Tracing this along, two flabby slightly elongated structures, somewhat the size and shape of an ordinary bean were noticed, one attached to either side and the left about an inch anterior to the right. The whole mass was removed and upon further examination proved to be an imperfectly developed ovary, to either side of which was attached a rudimentary testicle. The total weight of ovary and testicle was barely two ounces. After completing the operation the cloacum of the bird was then examined and the penis was found developed but resembling that organ as seen in a young bird of about six months.

The reasons to report the case are: 1. Because it is the first time that such condition in the ostrich is recorded. 2. Because it may be of service to any other operator confronted with a similar condition. 3. As it may serve to explain some cases of disappointment, which one so frequently hears of, when birds are camped off for breeding but fail to pair.—(*Agric. Journ., Cape Good Hope.*)

FRENCH REVIEW.

By Prof. A. Liautard, M.D., V.M.

Encephaloid Sarcoma Generalized to Both Kidneys of a Pig [*Prof. Cadeac*].—Neoplasms are rare in pigs. This case was observed in a six-months-old animal, with the lesions occupying the mesenteric glands and having spread to the kidneys. The primitive tumor had a discoid shape, oval and measured 15 centimetres in length with 10 in width. It was mammillated by the presence of round tumors varying in size from that of a cherry to that of a big nut. The whole was surrounded with adipose tissue. The tumor was rather of soft consistency. A transversal section showed its lobulated arrangement with a yellowish aspect and some hemorrhagic spots. The neoplasm had spread to both kidneys and formed nodular tumors, 15 to 20 on

each organ, some of these being yellowish gray and others surrounded with red effusion. The kidneys were of pale yellow color. The tumors extended into the renal substance. The microscopic examination of the principal growth revealed its nature of encephaloid sarcoma.—(*Journ. de Zootech.*)

SUPPURATING HYGROMA OF THE WITHERS AND INJECTIONS OF AMBRINE [*A. Videlier and Abraham, Army Veterinarians*].—A horse, aged nine years, belonging to a physician, had a cyst on the withers. It is punctured with the red iron and treated with a solution of peroxide and red ointment diluted in oil. After two week the artificial fistula is closed but the cyst remains. New puncture. The discharge becomes suppurating and remains persisting. The fistula does not heal. Other treatments were also resorted to without benefit, and before performing the operation of curetting the cavity of the cyst, it was decided to try injections of ambrine at 50 per cent. After eight injections the suppuration stopped and three days after the wound was completely healed and remained so. The horse resumed his work then without having any more trouble.—(*Rec. de Medec. Veter.*)

ABSCESS OF THE WITHERS CURED WITH AMBRINE INJECTIONS [*Same author*].—Six years of age, this mare had an abscess of the withers which burst and was treated with antiseptic injections. The cavity of the abscess filled up again and soon remained a fistula oozing thin serous pus. The mare was thrown, the fistulous tract freely incised and sublimate powder dressing is applied. This treatment had to be stopped as the animal presented some manifestations of mercurialism. Iodoform was then used. The cicatrization seemed then to progress; but a fistula was again the conclusion. It remained narrow and the injections had great difficulty to be inserted. After a few days the abscess had filled again. Opened with a free incision, a probe was introduced and the apex of the vertebral spinous processes were felt rough and necrotic. For two weeks the abscess was then treated first by an injection of pure peroxide followed by others half strength. A dressing of biniodide of mercury was also applied. All of these treatments proved of no avail and finally an injection of liquefied ambrine was made. The next day suppuration had changed in nature. It was thick and quite abundant. After the tenth injection the fistula was nearly closed. After three days more cicatrization was complete.—(*Ibidem.*)

FRACTURE OF THE RIBS—PNEUMOTHORAX AND HEMOTHORAX [*Mr. Guillemain, Army Veterinarian*].—A six-year-old mare suddenly, while at work, blows hard and shows a swelling of the left costal region. At rest, the respiration is accelerated dyspnœic. The mucous membranes are pale. Temperature is normal. Back of the left shoulder the thoracic wall at its lower part has a swelling, quite large, very painful and crepitating. There is a fracture with displacement of the sixth and seventh ribs. Percussion gives a tympanitic sound on a level with the gaseous crepitation, and complete dullness below. Auscultation shows diminution of respiratory murmur, and few dry râles of crepitation. The pulse is weak and internal hemorrhage is feared. The fracture is complicated with pneumothorax and hemothorax. A broad sinapism of mustard is applied and the apparatus left in place for two weeks so as to limit the motions of the ribs. After one week there is improvement. The animal is left in liberty in his box; but another hemorrhage has taken place as the temperature runs up to 40°. New local revulsion, sinapism and blister. The animal is taken with strangles and treated with three injections of 2 c. c. of oil of turpentine in the chest. The abscesses that followed this aborted the disease. The animal recovered with having only a slight costal deformity.—(*Rev. Veter. Milit.*)

TUBERCULOSIS OF CASTRATION IN SWINE [*P. Chaussé, San. Insp.*].—Tuberculosis by introduction through wounds of castration has been mentioned quite frequently in Germany. In France no observation seems to have been recorded. The author had doubt as to the reality of the infection in swine, when two cases were brought to his attention. In a seven-months-old pig which was in good condition, there was found subcutaneous caseo-calcareous nodules of the left inguinal region with appearance of a tuberculous state in the corresponding inguinal glands. The iliac and sublumbar glands were also diseased. Other glands through the organism were healthy.

In a second case, another animal of the same age presented in the perineum a bilobulated lesion formed by an agglomeration of caseo-calcareous tubercles, developed on a level with the wound of castration of the left side, around which were several subcutaneous tubercles in the adipose tissue. In the atrophied vaginal sheath there were inguinal glands forming a big mass, also caseo-calcareous, which existed on the right side. There were pul-

monary, hepatic, splenic, renal and bony lesions. In fact, an extensive generalized infection. The author thinks that these two infections were of bovine origin.—(*Rec. de Medec. Veter.*)

Two Cases of Vaginal Fibromas in Cows [*Mr. Lamoureux*].—In a first case the cow had just had her calf and after a prolapsus of the vagina. This was reduced without difficulty, and in exploring the vagina the hand of the writer came in contact with a hard mass as big as a child's head and located in the thickness of the mucous membrane. It was gently pulled out of the cavity and punctured to establish its nature. It was an encysted fibroma, which was enucleated after rupture of its peduncle. It weighed 1 kilogramme 150 grammes.

In the second case the cow had fortunately calved alone, but after her normal delivery there was an enormous mass hanging below the vulva. The animal seemed in perfect condition and unmindful of the trouble. The mass was smooth, reddish, dense in structure and very hard. It was a fibroma with a fairly long peduncle, round which a piece of strong twine was tightly applied. The mass was then cut off. It weighed 6 kilogrammes 700 grammes. The case might have been one of maternal dystokia if the tumor had interfered with the calving.—(*Ibidem.*)

ITALIAN REVIEW.

By Prof. A. Liautard, M.D., V.M.

Two Cases of Vaginal Sarcomas in Sluts [*Doct. Luigi Menicagli*].—Case 1.—Five-year-old slut has a tumor as big as a hen's egg, protruding from the vulva. Stranguria and hematuria are observed. Exploration with the finger shows that there are numerous other tumors of various sizes and that the urethral opening is also surrounded with small growths about the size of little nuts. Combining the exploration with abdominal manipulations it is ascertained that the trouble is located within the vagina only and that the sarcoma is limited to that cavity. The treatment followed was an operation in which after careful disinfection, the animal being anæsthetized, was laid on her back with hind paws kept apart and spreaders applied on the lips of the vulva. The principal growth was secured with strong forceps, drawn out and amputated. A second growth ovoid and

also rather big was again removed, as well as smaller ones. After when those surrounding the urethral opening had been cut off, the urethra was dissected out and transplanted on a surface of the mucous membrane free from neoplastic infection. The operation was completed by free irrigation with lysoformed water. Catheter had to be used for three days only. Cicatrization was completed by first intention in a few days, when the dog went home.

Case 2.—This occurred in a setter slut, aged 14, which had protruding between the lips of the vulva, a tumor as big as a pigeon's egg, of dark wine color, ulcerated and giving escape to a very offensive discharge. This condition was reported by the owner as of recent date. Vaginal exploration showed that the tumor had a small peduncle and had the aspect of a fibrous polypus, although the microscopic examination indicated its sarcomatous nature. The removal of the growth was done with the galvanic cautery and the operation proved even simpler than the preceding. Twelve days after the bitch was found dead without having shown any bad effects from the interference. Death was caused by cardiac insufficiency. But besides that lesion, tumors were found at the autopsy in the posterior mammæ, the abdominal cavity opposite the quadrifurcation of the aorta between the external and internal iliac. Nothing abnormal in the genital organs nor in the peritoneum.—(*Il. Nuovo Ercolani.*)

Contribution to the Study of Tumors in the Testicles of Cryptorchids in Horses [*P. Ghisleni*].—The author records a case of bilateral cryptorchidy in a seventeen-year-old horse, interesting because both testicles were the seat of neoplasms, a condition never recorded in horses before. A horse supposed to have been castrated had intermittent colics for three days, and the presence of a painful swelling of the right scrotal region had made him suspect of having scrotal inguinal hernia. When operated, it was found that the scrotal swelling was due to a tumor of the testicle partly engaged in the inguinal canal. The tumor was removed with the ecraseur, but the animal died during the night, with interperitoneal hemorrhage. The other testicle was found in the sub-lumbar region, forming a large tumor. The right testicle weighed 3 kilogs 800 grammes, and the left 10. The author classes these tumors in the group of orchidomas, established by Kitt for such neoplasms.—(*Clin. Veter. and R. G.*)

A Cow-shed Infected with Actinomycosis [*Doct. Arnaldo Fumagalli*].—The author was called to give his opinion as to the quality of the meat of a calf that had died suddenly. The anatomo-pathological lesions were those of pneumonia with little yellowish nodules spread in the pulmonary parenchyma. The meat was not used for marketing. A month after another visit was required for another calf which was very sick with pulmonary troubles. The animal being likely to die, he was killed and presented lesions similar to the preceding. A third case occurred with the same result and the lesions of the lungs being then examined with the microscope, proved to be those of actinomycosis. The stable from where these calves came was infected and its disinfection was carried out. Several weeks later four animals from the same place were castrated. The operation being carried out in the usual way. Of these two made a perfect recovery but the others developed an actinonrycotic funiculitis, which required another surgical interference. The straw used for bedding of these animals was infected, and while it had given rise to pulmonary disease in some animals by the inspiration of the specific elements, it promoted the infection of the testicular wound in the others.—(*Clinic Veterin.*)

Intra-Mammary Hernia in a Cow [*Adolfo Luciani*].—Called for a ten-year-old cow, in good condition, which presented in the region of the udder, principally on the left side, an œdematous swelling. The cow had worked plowing up to two or three days ago, when the tumor had been noticed, and it was found enlarging every day. It was rather hard and without point of fluctuation. Suspecting the case to be one of single mastitis, applications of belladonna ointment and flaxseed meal poultices were prescribed. After three or four days, there was no change and the tumor remained in the same condition. After carrying the treatment a few days longer, fluctuation was finally detected in the posterior part of the mammæ. An exploring trocar being introduced, instead of pus there escaped a fluid carrying fecal substances, and when the puncture was enlarged with a stroke of the bistoury, a free escape of fecal fluid took place. The animal was immediately sent to the butcher. At the autopsy was found a fold of the small intestine, located between the two quarters of the left mammæ. It had made its way through an opening near the linea alba, involving all the abdominal muscles. The portions

of the udder were already undergoing gangrene. It is probable that the accident was the result of a blow given with the horns of another cow.—(*Il. Nuovo Ercolani.*)

GERMAN REVIEW.

By JOHN P. O'LEARY, V.M.D., Buffalo, N. Y.

THE ETIOLOGY OF THE NODULES IN THE INTESTINES OF CATTLE [*Marotel*].—In a previous article Marotel stated that the larvæ which are found in the nodules in the intestines of cattle belong to the species *Oesophagostomum.* However, up to the present time he has advanced no direct proof to support his claim.

Accidentally, Marotel discovered in the intestines of a cow nodules which were about four months old. He hoped to find in this animal larvæ which were just undergoing a metamorphosis. Marotel made a minute examination of this parasite which led him to the following conclusions:

1. The metamorphosis of the parasite does not take place in the nodule, but in the lumen of the intestine.

2. This change occurs 4 to 5 months after the beginning of the disease, about the months April to June, when the worms are eight months old and 4 to 5 mm. in length.

3. The parasite belongs to the *Oesophagostomum radiatum* and is no uncinaria.

4. In the nodules the larvæ are found in the following stages of development: (*a*) As strongylus-like larvæ 500 to 1,000 microns long with a small, hornless mouth. (*b*) As ankylostomum-like larvæ 1,000 to 2,500 microns long with an elliptical indented mouth capsule. (*c*) As œsophagostomum-like larvæ 2,500 to 3,200 microns long with an elliptical mouth capsule and a cervico-ventral cuticular ring. The invasion of the parasites in the pastures occurs in August and September. They penetrate the intestinal wall, remain there from 6 to 7 months and produce the pea-shaped nodes and go through the three larval stages just described. During the months of March and April they escape into the lumen of the intestine; then they become sexually ripe and in May and June develop into typical œsophagostomum. In July and August they attain a length of from 15 to 20 mm. After copulation they lay their eggs; the latter being discharged with the feces, infect the pastures.—(*Deutsche Tierärztliche Wochenschrift, No.* 23, 1909.)

A NEW METHOD OF PRODUCING LOCAL ANÆSTHESIA.—At a meeting of the Berlin Medical Society, *Prof. Bier* described a new method of producing local anæsthesia, as a result of which major operations can be performed painlessly on the arms and legs. The procedure is as follows: Eucain is injected into the larger veins, an Esmarch's bandage being applied above and below the seat of operation. Bier had employed this method of producing venous anæsthesia in more than 100 cases, each attended with success. As a matter of fact it should supersede lumbar anæsthesia. If this method proved itself practicable in veterinary surgery, certain operations could be more readily performed.—(*Deutsche Tierärztliche Wochenschrift, No.* 12, 1910.)

THE TREATMENT OF LUNG-WORM DISEASE.—In the treatment of lung-worm disease we ought to have good results from intratracheal injections of a 1 per cent. solution of carbolic acid or potassium picronitricum. District Veterinarian Arndt of Gifhorn recommends intratracheal injections of a mixture of olive oil and oil of turpentine aa 100 grammes; creolin, 5 grammes. According to the reports of other practitioners the employment of cresotovaso-liniment internally has been very effective. A teaspoonful 4 to 5 times daily (20 per cent. for calves, 50 per cent. for young stock) given in combination with milk or gruel.—(*Berliner Tierärztliche Wochenshrift, No.* 10, 1910.)

INVESTIGATIONS CONCERNING ASPIRIN, NOVASPIRIN, AND ASPIROPHEN [*F. Block, Westercappeln*].—Dr. Block compiles the results of his investigations in the following brief sentences:

1. The modern salicylic acid derivatives, aspirin and novaspirin, are well borne by horses and dogs, in proper doses.

2. Their action upon dogs in doses of 0.7 grm. pro kg. body weight is toxic. Double doses of the same are fatal. Single doses of 0.4 grm. pro kg. body weight are not injurious to health. For horses single doses of 300 grms. are toxic.

3. Aspirophen contains free salicylic acid and its action is less efficacious than aspirin and novaspirin For dogs, 0.4 grm. pro kg. body weight is poisonous; 0.7 grm. pro kg. body weight is fatal; 300 grms. given to the horse sickens the animal. Therefore the use of this agent in veterinary practice is not recommended.

4. The symptoms of intoxication induced by aspirin, novaspirin and aspirophen are similar to those of salicylic acid poisoning.

5. The elimination of salicylic in the urine after the administration of aspirin and novaspirin begins in about half an hour and disappears at the end of the third day. Aspirophen is completely eliminated after the second day.

6. The therapeutic dose of aspirin and novaspirin for the dog is 0.5 to 3.0 grms.; for the horse, 25 to 100 grms.—(*Deutsche Tierärztliche Wochenschrift, No.* 9, 1910.)

"I WISH I could see why I don't do better with my cows," said a discouraged farmer to one who was more prosperous.

"Well," said the other, "maybe if you would let a little more good dairy light shine into your mind, you would see."—*Hoard's Dairyman.*

LITTLE MURIEL flew into the house, flushed and breathless. "Oh, mother," she cried, "don't scold me for being late to tea, for I've had such a disappointment! A horse fell down and they said that they were going to send for a horse doctor, so of course I had to stay. And after I'd waited and waited he came, and oh, mother, what do you think? It wasn't a horse doctor at all. It was only a man!"—*Everybody's Magazine.*

FOURTEEN of the principal horse fountains in the City of Boston have each been recently equipped with the "Simmons" apparatus for constantly and quickly removing automatically all surface scum, impure and foreign substances from the water so that the transmission of glanders and other contagious diseases from one drinking animal to another may be practically eliminated. It is an exceedingly clever invention.—*Our Dumb Animals.*

DR. R. C. LONGFELLOW has been notified by Dr. William C. Woodward, secretary at Washington, that he was elected at the Milwaukee meeting to membership in the laboratory section of the American Public Health Association. This section is composed of the best known pathologists, bacteriologists and laboratory workers in America, Canada, Mexico and Cuba. The election of Dr. Longfellow to this body of scientific men is in recognition of his work in this city.—*Clipping.*

SOCIETY MEETINGS.

EXTRACT FROM FOURTEENTH ANNUAL MEETING OF THE UNITED STATES LIVE STOCK SANITARY ASSOCIATION.

Held at the Grand Pacific Hotel, Chicago, Ill., December 5, 6, and 7, 1910. President, C. E. Cotton.

ADDRESS OF WELCOME BY J. H. MOORE, PRESIDENT, CHICAGO LIVE STOCK EXCHANGE.

The removal of tuberculosis from the State of Illinois, which threatens not only live stock purchasers, but the consumers of milk and beef. He spoke of the need of legislation which would prohibit any state from making Illinois a dumping ground for diseased cattle. He also spoke of the tuberculin test, as to whether or not it was a reliable guide for determining whether or not an animal was affected with tuberculosis.

RESPONSE BY DR. MOHLER.

Dr. Mohler stated that this country had five billion dollars invested in the various kinds of domesticated animals, which, on every side, were threatened with pestilence and disease, and stated that two hundred millions of these were lost annually from animal disease.

ADDRESS BY PRESIDENT C. E. COTTON, V.M.D.

By the change in our constitution at the last annual meeting any person engaged in live stock sanitary work for federal, state, territorial, county or municipal governments, and any other person interested in live stock sanitation is eligible and may be elected to active membership. This should make this association the leading and largest organization of its kind in the world, and we must not forget our responsibilities. We should be the advisory body for all federal, state, county and municipal legislation for the control of contagious diseases of live stock and we should use our influence to have such legislation in harmony and not conflicting.

Our association is composed of laymen and stockmen interested in the welfare of our live stock industry, as well as scientific men engaged in investigation and control of contagious diseases. These laymen are of the greatest value in the accomplishment of our work to educate the public. At our meetings we learn of the study of the various diseases and the practical methods of controlling and eradicating them, and we return to our homes prepared and encouraged to educate the public in our localities and to work for the proper legislation to control and stamp out contagious diseases.

The conservation of the live stock industry of the country, principally from the standpoint of the money value which it represents, and also from the standpoint of human health, places the work of the live stock sanitarian equal to, if not of greater importance than, any other branch of government control.

He also spoke about the cattle tick and its eradication, the work that is being undertaken with hog cholera in the various states and the eradication of the sheep scab in the western states which is progressing rapidly. Also the control of lip and leg disease in the sheep in the West. One of the greatest problems is controlling glanders, rabies and tuberculosis.

He also commented on the International Commission on Bovine Tuberculosis. Also regarding the laws of the various states and hoped that they would soon be of a uniform character and that this association would lend their aid in bringing this about.

The Secretary announced that thirty-four states had representatives present.

The next paper was that of Dr. A. D. Melvin, Chief of the Bureau, who read a paper entitled, "Federal and State Co-operation in Live Stock Sanitary Control." The doctor suggested a more systematic co-operation with the Federal government and the different state authorities. He deplored the fact that the United States did not have the same as European countries, a system for reporting the presence and the extent of contagious diseases of live stock. He thought by thorough co-operation with the various live stock boards that something tangible could be worked out, which would be of great importance to the United States. He stated that it was desirous to secure fuller information on the following diseases: Hog cholera, anthrax, glanders, tuberculosis, contagious abortion, scabies, necrobacillosis, contagious lymphangitis and rabies. In

his paper he gave an outline of a plan that he had in mind, and which should be carefully considered by all sanitary boards.

The next was a paper by Dr. R. P. Steddom on "Tick Eradication in the South." The doctor went into the history of this work and gave in detail the progress made in the eradication of this disease in the South, and also suggested some new regulations. His paper gave a very hopeful outlook for the eradication of this disease.

Dr. Steddom's and Dr. Melvin's papers were then discussed by various members, especially the members of the South, who gave their version as to the greatest obstacles in the way of more successful work. The principal ones discussing this were: Dr. Keane, Dr. Powers, Mr. Bryan, Dr. Lewis, Peter Bahnsen, Dr. Nighbert and E. B. Spiller, Dr. Forbes, Dr. M. P. Anderson, Dr. T. M. Owen, Dr. J. A. Kiernan, Dr. L. J. Allen, Dr. Ellenberger, Mr P. S. Haner, Dr. Reynolds, Dr. Ward, Dr. Crewe and Dr. Leech.

The next paper was that of Dr. Luckey, and was of much importance to the cattle owners for it described a new parasite (*Oesophagostoma Inflatum*). This parasite was found during the wet season on low, wet ground and caused a considerable loss in a number of herds, and the doctor described the parasite, also the symptoms in a very clear manner. He also gave his line of treatment and the prevention of this disease. This was discussed by Doctors Ranson, of the Bureau of Animal Industry; Juckniess, of Nebraska, and Moore, of New York.

The next was that of a report by Dr. Niles on "Hog Cholera Investigation." The doctor gave a report of the work of the Bureau of Animal Industry and stated what methods they were pursuing and the experiments they were conducting to perfect the methods now in vogue. He gave a very great deal of experimental data which was of great importance to the members present.

This was followed by a very interesting paper by Dr. Eichhorn, who had been abroad and while there, visited the laboratories of Austria-Hungary. He described in detail the workings of this large laboratory, stating the number of animals that they had under treatment and the number of acres that it required. This laboratory has produced, during 1910, monthly, about 260 litres of serum. The institution aims to have always on hand a supply of serum to comply with all requests. He stated that they had treated approximately 400,000 animals and described in

detail the method of their manufacture, how the material was sent out to the farmer and what they charged for it.

The next paper was that of Dr. Schoenleber, entitled, "Some Necessary Precautions in Anti-Hog Cholera Field Work." He gave a resume of the work done in Kansas and stated that they had treated approximately 20,000 head of hogs.

This was followed by Dr. Fisher, of Ohio, who reported on the serum work in his state, giving in detail the work done there; that they had sent out about 60,000 20-c. c. doses, used 312 hyperimmunization hogs. He also described their method of sending out their serum and the rules and regulations governing the same.

This was followed by Dr. Reynolds, of Minnesota, who gave a report of hog cholera work in the State of Minnesota, describing their method and the rules and regulations under which they worked in sending out this serum.

Following Dr. Reynolds, Dr. Peters reported for the State of Illinois, stating that 22,000 head of hogs were treated during the year. The tabulated reports of 15,000; 31 per cent. of the 15,000 were sick, and 79 per cent. of the 15,000 were saved.

This was followed by Dr. Marshall, of Wisconsin, who also reported for the State of Michigan. He was followed by Dr. Craig, of Indiana, and Dr. Moore, of New York. In conclusion Dr. Dorset, the gentleman who originated the method, then said a few words. He deplored the fact that the serum was employed largely in diseased hogs, stating that this would be expensive and continue to be so, as long as this method was practiced; and stated that there should be some well-defined method made in co-operation to secure the final reduction of this disease. He suggested that the various states adopt the plan recommended by Dr. Melvin in his paper before this meeting. He believed that some method could be worked out so that in a short time this disease could be eradicated.

Dr. Hughes read a very interesting paper, entitled, "The Veterinarian as a Factor in Sanitary Control Work." The doctor gave a history of sanitary control work throughout the world and very ably brought forth the influence of sanitary control work and how sanitary work had come about and the results accomplished since the inauguration of sanitary work by the various governments throughout the world. He enumerated the number of diseases that have been practically stamped out

or held in check thereby. He also showed up the defective side of the work and made suggestions where this could be materially strengthened. This paper brought out a liberal discussion which was participated in by many.

The next paper was that of O. E. Dyson on "A Reasonable Plan for the Control of Bovine Tuberculosis." This paper treated on the fundamental principles involved in the eradication or control of Bovine Tuberculosis. Under specific recommendations, he said in order to encourage a larger production of healthy cattle throughout the United States, laws should be enacted in every state requiring that anyone having knowledge of the existence of this disease in cattle or hogs should notify the state representatives. He also suggested that provisions be made under quarantine regulations to permit breeders to sell or purchase cattle which have reacted to the tuberculin test and are properly branded. No compensation should be paid to the owners of animals slaughtered until said owner had conformed to every regulation supplied by state or Federal authority. The sale, distribution or use of tuberculin for testing cattle should be prohibited, except under state and Federal laws, providing for its official use. The doctor had herds classed under A, B and C.

Ex-Governor Hoard's paper on "Tuberculosis Control from a Layman's Standpoint." He gave his first experience with the use of tuberculin and what it done for him. At the first test he discovered four animals to be affected. These were killed and from then on he tested regularly and maintained a clean herd. He does not take any animals to his herd that have not been thoroughly tested and quarantined for months. He says, "to this latter I owe a large part of my exemption from this disease." He says, "every man should have pride and patriotism enough to wish to maintain a healthy herd. In my opinion, every farmer should test his cattle once a year at least and take none to his herd until he is absolutely certain that they are free from all contagious diseases."

The following paper was given by Dr. Ravenel, on "Control of Bovine Tuberculosis by Means of Vaccination." Dr. Ravenel gave a very interesting paper. He gave the history of bovine vaccination and the commission who were responsible for the work as early as 1892, and brought the work of vaccination against this disease to date. He quoted all the investigators that had taken part in vaccination against tuberculosis and also gave a detailed report of the methods pursued and the results

obtained. He was hopeful that a vaccine would be found that could be used to immunize cattle against tuberculosis and quoted investigators that are at work.

The following paper was presented by Dr. Ward, of Minnesota: "Extension of State Control of Tuberculosis." The doctor recommended that, as pure bred cattle are frequently tuberculous (he said, in fact, very few of the fashionable breeds were free from the disease), therefore, some measure should be put in force to eradicate this disease among them; before enforcing the testing of pure bred herds, a legislative act is necessary. He stated that opposition on the part of the breeders to such a measure could not be very pronounced. He stated, "having cleaned the pure bred herds, the next great source of danger was the creameries." He recommended the pasteurization of all creamery by-products. He says the greatest problem of all city ordinances lies in protecting the dairymen from buying diseased animals. Many dairy cows are shipped interstate to stockyards situated at points like Chicago, Omaha, Sioux City and St. Paul, which are never inspected for the reason that they are shipped for supposed slaughter, but on arrival at the yards many of these are sold to dairymen without inspection. He recommends the compulsory notification of the existence of tuberculosis; and another feature in extending control work, which has frequently been overlooked, is the disinfection of premises in which diseased animals have been housed. He is heartily in favor of uniform certificates of health, which could be readily identified by all railroad agents. To prevent shippers and veterinarians from supplying themselves with blank certificates, he would suggest a form be adopted similar to the B. A. I. 24-B, having printed thereon, "Permission of the United States Department of Agriculture." Sanitary authorities could then issue blank forms to reputable veterinarians as required.

This was followed by a general discussion by Drs. Reynolds, DeVine, Luckey, Moore, Leach, Behnsen, Craig, Melvin and Bryan.

Following this was Dr. Fraser's paper on, "Sanitary Milk from the Producer's Standpoint." He stated that milk was entirely an infant food and about sixty-five per cent. of all babies are brought up on this food and therefore the public may rightly demand sanitary milk. He stated that in some places it was almost impossible to secure in the open market a good milk product. He suggested to bring about an improvement in these con-

ditions, the producers and handlers of the product should be educated to the importance that if the milk is not kept clean that bacteria will enter and thereby cause death to human beings. He deplored that the true food value of milk was not appreciated and that it was not more freely used than it is. He drew attention to the importance of cleanliness in the production of milk, and that if the product was not kept clean a large amount of sickness and suffering was caused therefrom. He stated that high prices do not necessarily mean clean milk. Unfortunately the general public is not earnestly interested in the milk problem further than the price is concerned.

The next paper was that of Claude D. Morris, V. S., on, "Sanitary Handling of Commercial Milk." He described the up-to-date method of handling milk on the farm, how it is taken from the cow and kept in a clean condition until it is delivered, either to the factory, or to the consumer. He described practical methods for the country bottling factory system in conformity with the state and city authorities in connection with the market production; also, to have his herd clean from diseased animals. He pleaded for the better conditions on the farm, in correcting the errors that are very often found there.

The next paper was by Dr. Black on "Sanitary Milk"; which would be practically free from diseases, such as typhoid germs, scarlet fever and diphtheria. He gave in detail the work of the commission and what they were doing for the milk consumers and the producers of the State of Illinois that were supplying milk to the City of Chicago.

Dr. Evans, City Health Commissioner of the City of Chicago, then spoke on the subject of clean milk. He pleaded for clean milk and gave in detail the work that his laboratories were doing in Chicago, for the milk men that are furnishing milk to the City of Chicago, and how they had reduced the death rate among babies thereby, and also other sickness in proportion. He described at length the manner in which the City Health Department was handling this very important subject. This was discussed by Drs. Van Derslice, Lackner, Moore, Clark, Luckey, Morris, Brand, Dyson, Black and Morgan.

Dr. Mohler described the Russian diagnostic test for glanders. He had some specimens presented and demonstrated the method before the association, which was intensely interesting to all those present. He stated that this method was reported as very accurate and very much easier in its application

and hoped that the experiments would continue as favorably as they have been the last few months, and he thought that if they would continue to be so, that it would be universally adopted as a diagnostic agent for glanders.

The next was Mr. W. R. Manss. His subject was, "Reasonable Sanitary Measures in Live Stock Transportation." Mr. Manss related the method of handling live stock and the difficulties that arise in transporting the same. He cited the demands that are placed on the railroad companies by the shippers and urged for hearty co-operation between the state and Federal authorities. Also made an eloquent plea for a uniform certificate of health that would be recognized by all authorities and that could be easily interpreted and would not require any legal talent, so that when a shipment started from one end of the United States with a certificate, that that certificate would be honored throughout.

Papers by Dr. Mack and Dr. Kinsley related to the same subject, "Equino Anemia." They brought out the fact that this disease in horses is wide-spread, and that it had great need of investigation, especially along the lines of a curative agency. The fact was brought out in the discussion that horses affected with this disease and apparently recovered, upon examination eighteen months afterwards were found to be still affected with the disease. The discussion further brought out the fact that all the men interested in experimenting with this disease have not been able to transmit this disease from one animal to another by contact, by allowing a healthy animal to be placed in the same stall with the diseased animal for a very long period, of many months, without any results. Also, the thought of it being produced by some insect, they thought was very remote.

The next paper read was the report of the Committee on Basic Law.* This committee reported on uniform laws for the various states regulating sanitary boards and live stock commissions.

One of the most important resolutions passed was that of the Committee on Uniform Health Certificates:

"This Committee recommends to the United States Live Stock Sanitary Association, that it request the B. A. I. to formulate a uniform certificate for the interstate shipment of live stock destined to states requiring inspection, and in the case of cattle for milk production and breeding purposes, destined to

* Published on page 573, this issue of the REVIEW.

states requiring the tuberculin test; such certificate to be accompanied by a record of said test, issued by a qualified veterinarian regularly registered with the Bureau of Animal Industry." R. W. HICKMAN, S. H. WARD, J. F. DEVINE, CHARLES KEANE, PETER F. BAHNSEN.

REPORT OF COMMITTEE ON TICK ERADICATION, UNITED STATES LIVE STOCK SANITARY ASSOCIATION.

CHICAGO, ILL., December 7, 1910.

Your committee on Tick Eradication recommends the following territory situated within the quarantine area, be released from quarantine.

Mississippi.—Release from quarantine Marshall County north and west of the Illinois Central Railroad. Benton County north of Tippah Creek.

Tennessee.—Release from quarantine the balance of Madison County, Overton County, balance of Fentress County, balance of Lincoln County, and that portion of Polk County north of Hiawassow River.

South Carolina.—Release from quarantine Union and Laurens Counties.

Virginia.—That Fluvanna County and Chesterfield County be released from provisional quarantine.

North Carolina.—Release the following counties: Stanley, Randolph, Wake, Chatan, Montgomery and Franklin.

Texas.—Release the following area from quarantine: Cottle County, and those parts of Hardeman County north of the Fort Worth and Denver City Railway, Mitchell and Howard Counties north of the T. P. Ry.

Oklahoma.—That the following area be released from quarantine: That part of Jackson County now in the blue, that portion of Kiowa County lying north of the line between townships Four and Five North, and that part of Township Four, North, Ranges Nineteen and Twenty, West, that portion of Caddo County now in the blue, that portion of Pottawattamie County included in Townships Ten and Eleven North, Two East, that portion of Lincoln County now in the blue and that portion of Pawnee County included in the following named townships—Townships Twenty-one and Twenty-two North, Five East, Twenty-one and Twenty-two North, Four East, Twenty-two North, Three East, and those portions of Twenty-three North,

Three East, Twenty-three North, Four East, Twenty-three and Twenty-four North, Five East.

Alabama.—No recommendation. *Missouri.*—No recommendation. *Arkansas.*—No recommendation. *Louisiana.*—No recommendation. *California.*—No recommendation.

Your Committee on Tick Eradication by resolution, also recommends as follows:

RESOLVED, That there be no open season for the movements of southern cattle this year, and that no additional territory be added to the provisionally quarantined area. JAMES LEWIS, Chairman; CHARLES KEANE, Secretary; G. T. BRYAN, E. R. FORBES, M. RAY POWERS, W. P. ELLENBERGER.

The election of officers for the ensuing year, was as follows:

For President, Dr. J. F. DeVine, of Albany, N. Y.

First Vice-President, F. A. Walker, of Massachusetts.

Second Vice-President, Dr. Charles Keane, of Sacramento, Cal.

Third Vice-President, G. T. Bryan, of Guthrie, Okla.

Fourth Vice-President, Dr. W. F. Crewe, of Devil's Lake, N. D.

Fifth Vice-President, Dr. M. H. Reynolds, of St. Paul, Minn.

Secretary, J. J. Ferguson, of Chicago, Ill.

After a vote of thanks to President Cotton for the efficient and capable manner in which he had conducted the meeting, the Convention adjourned *sine die*. The following states sent in reports: Massachusetts, Arizona, Wisconsin, South Carolina, North Dakota, Delaware, North Carolina, Oregon and Louisiana.

J. J. FERGUSON, Secretary.

REPORT OF PRESIDENT JOLY, MAINE VETERINARY MEDICAL ASSOCIATION.

To Dr. E. P. FISH, Secretary, Board of Health, Waterville, Me., September 22, 1910.

DEAR SIR—I hereby submit my report of the work done in relation to the milk supply for the city of Waterville.

On account of so many cases of tuberculosis in the city and the efforts being made daily by the Central Maine Association for the Relief and Control of Tuberculosis, your board felt its duty to ascertain the quality of our milk supply; so according

to a vote of the Waterville Board of Health, I was authorized to interview the milk producers and offer to them the free testing of their herds.

I have tested with tuberculin fifty-four herds, 618 head of cattle in all, and found twenty-five tuberculous animals.

As the milk is all mixed together at the dairy, one tuberculous cow in a herd will contaminate the whole output of milk of the entire herd.

These twenty-five diseased cows were found in nineteen herds, containing 248 cows. One cow will supply milk to about twenty-five persons during the year; so 248 cows can furnish milk to 6,000 persons. Consequently, half the population of Waterville at some time during the last year have drunk tuberculous milk.

In connection with the work, I was given the right by the Cattle Commission, to condemn tuberculous animals and to appraise the same, the owner to receive full appraisal, limited to $50, and I also had the supervision of the whitewashing and the disinfecting of infected stables, charging the expenses to the state.

These condemned animals were shipped to E. W. Penley's abattoir, in Auburn, where a post-mortem was held by Dr. W. W. Groff, United States Government Inspector, from the Bureau of Animal Industry, and a report made to the Maine Cattle Commission. The carcasses went to the rendering tank.

I have issued fifty-four certificates of clean bill of health to the owners of the herds which I have tested.

Every milk producer has complied with the request of the Board of Health, with the exception of six persons.

We have upon the market a blended milk, which is no more desirable than tuberculous milk. During the summer over 1,000 gallons of such milk have been sold in the city.

Blended milk is composed of nine parts, in volume, of pasteurized skimmed milk, and one part of pasteurized cream; by being mixed thoroughly it will test 4 4/10 per cent. of butterfat. It is not unlawful to sell blended milk, but it should be labeled.

Pasteurized milk should not be kept over twenty-four hours, even if it seems to be sweet; for it will become putrid before it sours.

In order to complete the work, and assure the citizens of our city that the milk supply is free from diseased animals, also

free from other sources of danger, the Board of Health must adopt rules and regulations in regard to the sale of milk. It is up to the Board of Health to act accordingly. In closing, I wish to state that these fifty-four milk producers who have had their herds tested have been pleased to co-operate in the work, both by showing me their confidence and treating me with courtesy.

ALPHA PSI FRATERNITY—GAMMA CHAPTER.

Alpha Psi fraternity, a national veterinary organization, conducted its second biennial convention in Chicago November 25th and 26th, 1910, the six chapters being represented.

Alpha Chapter, of Ohio State Cniversity, sent H. A. Greaves; Beta, of Cornell, was represented by E. J. Merchant; Gamma, of Chicago Veterinary College, by its president, R. S. Hamilton; Delta, of Kansas City Veterinary College, by E. H. Salisbury; Epsilon, of the University of Pennsylvania, by H. J. Werntz; and Zeta, of Colorado State College, by J. D. Knapp. The national officers were on hand with the delegates, and for two days all combined business with pleasure and made the convention a memorable one.

Gamma Chapter showed royal hospitality to all by providing a program of entertainment for three evenings. On Thursday night there was a smoker in the rooms of the chapter, which was attended by the delegates and national officers, as well as by all the chapter members, and their honorary members, including Drs. L. A. and Edward Merrillat, C. A. White, D. A. Hughes and J. F. Ryan. Professional talent entertained, and during the evening the visiting fraternity men had the opportunity to meet the Chicago members. On Friday evening all visited the International Horse Show, occupying seats which gave all a splendid opportunity to view the stunts on the tanbark. The feature of the program was the banquet on Saturday evening tendered to the delegates and national officers by Gamma Chapter in the Chicago room of the Great Northern Hotel. Seventy covers were laid, the banquet being followed by brief talks by the delegates, National President A. F. Schalk and honorary members of Gamma Chapter, as well as two prominent guests, President Joseph E. Hughes and Dean A. H. Baker, of the Chicago Veterinary College, who expressed their pleasure in being present. There were remarks by George L. Drury, who welcomed

all; Drs. E. L. Quitman, Edward Merrillat, J. F. Ryan, D. A. Hughes, A. H. Baker and Joseph Hughes. There were many complimentary expressions from the above speakers which were of much gratification to Gamma Chapter men, as well as to the visiting delegates and officers. Dr. Schalk spoke for the fraternity at large. L. J. Rielly was toastmaster.

The next convention of the fraternity will take place in Philadelphia two years hence. These officers were elected to serve until then: President, Dr. Harry E. Kingman, Colorado State Veterinary College; Vice-President, Dr. Charles J. Miller, Cornell University; Secretary, Dr. H. Preston Hoskins, University of Pennsylvania, and Treasurer, A. M. Janson, Ohio State University.

GEO. L. DRURY, Secretary.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.

The regular meeting of this association was held in the lecture room of the New York American Veterinary College, 141 West Fifty-fourth street, on Wednesday evening, December 7, with the president, Dr. E. B. Askerman, presiding.

Dr. R. W. Ellis acted as secretary pro tem awaiting the arrival of the regular secretary.

Dr. Mangan, chairman of the Prosecuting Committee, reported, and his report was discussed by Drs. McKinney, Darke and Kingston.

The committee dealing with the matter of the proposed establishment of a Veterinary Bureau in connection with the Department of Health, reported progress.

Dr. Kingston reported a case of a horse running away and badly injuring the orbital fossa and side of the face and head. So much skin was destroyed that he feared the part would not be covered except by sear tissue. He asked for opinions regarding the feasibility of grafting skin onto the denuded surface. None of the members present had had any experience in skin-grafting on the horse.

Among the queries in the question box was the following: "Is a thrombus necessarily a foreign body?" This was discussed by Drs. Ellis, Clayton and Mangan and others, and the consensus of opinion was that the thrombus is a foreign body.

The election of officers for the ensuing year followed, with these results: President, W. Reid Blair; vice-president, R. H. Kingston; secretary and treasurer, R. S. MacKellar.

Dr. J. E. Crawford will present a paper at the January meeting on the "Treatment of Open Joints"; and Dr. H. Stark will present a paper on "Ankylosis."

Dr. McKinney moved that the association hold a smoker in January; seconded and carried. Drs. Clayton, Ackerman and Smith were asked to serve as a committee of arrangements for this smoker.

Meeting adjourned.

W. Reid Blair, Secretary (M. B.).

CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION.

The first semi-annual meeting of the Central New York Veterinary Medical Association was held on Friday, November 25, at the Vanderbilt Hotel, Syracuse, New York, many of the prominent veterinarians of Central New York being present. Much interest is shown by the members of the profession in the welfare of this society which was organized in June of the present year and but recently incorporated.

Dr. W. G. Hollingsworth, of Utica, the president of the association, acted as chairman. The morning session was called to order at 10 o'clock and an informal discussion of subjects of professional interest ensued. At 12.30 adjournment was taken for lunch. Upon re-convening at 2 p. m., a business session was held at which time applications for membership were received from nine veterinarians. These were referred to the Board of Censors and, upon a favorable report from that body, the men were duly elected to membership. Dr. V. A. Moore, Dean of the New York State Veterinary College, who was present throughout the convention, was elected to honorary membership. Upon the conclusion of the business session, the following papers were presented by members of the society: "Utilizing a By-Product," Dr. J. M. Currie; "A Few Cases that We Meet in Everyday Practice," Dr. J. A. Pendergast; "A Little Bit of Everything," Dr. J. G. Hill; "Verminus Bronchitis," Dr. G. S. Elliott. Address: "Promotion of Veterinary Science and Education," Dr. V. A. Moore.

The closing feature of the convention was a banquet held at the Vanderbilt Hotel at 7 p. m. A pleasing menu was provided by the management of the hotel and it was thoroughly enjoyed by those present. At the conclusion of the dinner, toasts were called for by Dr. H. A. Turner, as toastmaster, and responses were given by Dr. D. M. Totman, a prominent physician and officer of the Health Department of Syracuse, and by the Honorable George W. Driscoll, one of the city's most prominent attorneys. Dr. V. A. Moore and other members of the society also spoke at this time. At a late hour the convention was adjourned and those present left the banquet hall, feeling that, as a society, much had been accomplished, and as individuals, much had been gained.

W. B. SWITZER, Secretary.

WASHINGTON STATE COLLEGE VETERINARY MEDICAL SOCIETY.

The regular meeting of this society was held November 4, 1910, President Prior occupying the chair. After calling the meeting to order and the reading of the minutes of the previous meeting, Mr. Prior read the program for the ensuing year. The work as outlined proposes to have each member of the society address the members upon some topic of general interest to the profession during the college year.

Mr. Davis, of the *Washington Agriculturist,* addressed the society and stated the need of a veterinarian or a veterinary student on the editorial staff of that publication. This was followed by a general discussion on the subject. Drs. Ralston and Heldering and Messrs. Prior and Clark spoke in favor of this action. President Prior appointed Mr. Thompson Veterinary Editor of the *Washington Agriculturist.*

The following program was then rendered:

"Distemper of the Dog," Dr. Hildering.

"The Study of the Dog," Mr. Donohue.

Both of these papers show the need for much canine study in the veterinary colleges. Dr. Hildering's paper was particularly instructive and entertaining, and the subject was treated in a thorough manner. This paper created considerable discussion and a vote of thanks was tendered to Dr. Heldering.

The arrangements for the annual veterinary banquet and the Veterinary-Pharmacy football game were then discussed, after which the meeting adjourned.

R. J. DONOHUE, Secretary.

SOCIETY OF COMPARATIVE MEDICINE, NEW YORK STATE VETERINARY COLLEGE, CORNELL UNIVERSITY.

A regular meeting of this society was held November 5 at 8 p. m. Dr. V. A. Moore introduced as the speaker of the evening Dr. E. B. Ackerman, of Brooklyn, N. Y., president of the New York State Veterinary Medical Association. Dr. Ackerman took for his topic "The Practical Examination of Horses for Diagnosis and Soundness." He said in part: "This is a somewhat broad subject and I am not going into detail in treating it, but I shall deal with generalities. These remarks are not taken from any books but are the result of years of practice in judging horses." Dr. Ackermen then gave practical methods for detecting defects which to the untrained man would pass unnoticed. He said in closing: "Many of our diagnoses are made by exclusion. For some reason it cannot be this, it cannot be that for another reason, and finally it narrows down to a short list from which you can determine the trouble. Oftentimes little things which do not seem to amount to a great deal, if carefully done will count much toward your success as a practitioner." Another meeting of the society was held November 19. Two papers were read by students of the Veterinary College. The subjects of these papers were "An Outbreak of Anthrax" and "Diagnosis and Treatment of Cases of Purpura." A discussion followed the reading of each paper.

C. P. FITCH, Corresponding Secretary.

REPORT OF COMMITTEE ON STATEMENT OF FUNDAMENTALS OF GOOD STATE LIVE STOCK SANITARY LEGISLATION.

Adopted by the United States Live Stock Sanitary Association, Chicago, December 7, 1910, as standard and model for the United States.

Committee.—M. H. Reynolds, Chairman, University of Minnesota and State Live Stock Sanitary Board; Paul Juck-

niess, State Veterinarian, Nebraska; D. F. Luckey, State Veterinarian, Missouri; M. P. Ravenel, Member Wisconsin Live Stock Sanitary Board; F. S. Schoenleber, Kansas Agricultural College and Experimental Station; R. P. Steddon, Federal Bureau of Animal Industry.

1. Legal provisions should be so made that the executive officer must be a veterinarian.

2. The executive officer should be appointed by a small nonpartisan board.

3. Said board should consist of stockmen and veterinarians.

4. Final authority for general policies and general methods should rest with the board.

5. Election, term of service, and pay of executive officer and other appointees engaged in state live stock sanitary control work should be in the hands of the board.

6. Board members should do no field work in person and should receive no pay other than actual expense incurred in attending necessary board meetings.

7. The board should be invested with authority to suitably dispose of animals affected or exposed to communicable disease.

8. The board should be authorized to issue necessary operative quarantine regulations.

9. The executive officer and deputies should be invested with necessary power so that they may enter premises, inspect, quarantine, and enforce disinfection.

10. The law should prescribe penalties for violation of law or regulation.

11. The law should provide that anybody who knows of or suspects the existence of any communicable disease must report to the state under penalty.

THE following poetic expression of appreciation from Dr. E. D. Hudson, Gettysburg, Pa., December 14, 1910:

Oh you AMERICAN REVIEW,
We cannot do without you;
Oh, no, not I,
I'd sooner do without my pumpkin pie.
You're welcome to my $3.00 and a rousing cheer,
With a Merry Christmas and a Happy New Year.

VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list :

Name of Organization.	Date of Next Meeting.	Place of Meeting.	Name and Address Secretary
Alumni Ass'n, N. Y.-A. V. C.....	.....	141 W. 54th St.	J. F. Carey, East Orange, N.J.
American V. M. Ass'n.....	Aug. 22-25, 1911.	Toronto, Can.	C. J. Marshall, Philadelphia.
Arkansas Veterinary Ass'n.....	.....	.....	Horace E. Rice, Little Rock.
Ass'n Médécale Veterinare Française "Laval".....	1st and 3d Thur. of each month	Lec.Room,Laval Un'y,Mon.	J. P. A. Houde, Montreal.
B. A. I. Vet. In. A., Chicago.....	2d Fri. ea. mo...	Chicago.....	H. A. Smith, Chicago, Ill.
B. A. I. Vet. In. A., So. Omaha ..	3d Mon. ea. mo.	S.Omaha, Neb	E. J. Jackson, So. Omaha.
California State V. M. Ass'n.....	.....	San Francisco.	J. J. Hogarty, Oakland.
Central Canada V. Ass'n.....	.....	Ottawa	A. E. James, Ottawa.
Central N. Y. Vet. Med. Ass'n....	June and Nov...	Syracuse	W. B. Switzer, Oswego.
Chicago Veterinary Society.....	2d Tues. ea. mo	Chicago	D. M. Campbell Chicago.
Colorado State V. M. Ass'n.....	Jan. 20, 1911.....	Denver	M. J. Woodliffe, Denver.
Connecticut V. M. Ass'n.....	1st Tues.Feb. '11	Hartford.. ...	B. K. Dow, Willimantic.
Genesee Valley V. M. Ass'n.....	.....	.....	J. H. Taylor, Henrietta.
Georgia State V. M. A.....	.....	.....	P. F. Bahnsen, Americus
Hamilton Co. (Ohio) V. A.....	.....	.....	Louis P. Cook, Cincinnati.
Illinois State V. M. Ass'n.....	.....	.....	J. H. Crawford, Harvard.
Indiana Veterinary Association...	Jan. 11, 12, 1911..	Indianapolis..	E. M. Bronson, Indianapolis.
Iowa Veterinary Ass'n.....	Jan. 3, 4, 5, 1911.	Marshalltown.	H. C. Simpson, Denison.
Kansas State V. M. Ass'n...	Jan. 10, 11, 1911.	Topeka	B. Rogers, Manhattan.
Kentucky V. M. Ass'n.....	.....	Not decided ..	D. A. Piatt, Lexington.
Keystone V. M. Ass'n.....?.....	.....	.....	E. H. Yunker, Phila.
Louisiana State V. M. Ass'n.....	.....	.....	E. P. Flower, Baton Rouge.
Maine Vet. Med. Ass'n	Jan. 1911	Augusta.....	C. L. Blakely, Augusta.
Maryland State Vet. Society.....	.....	Baltimore.....	H. H. Counselman, Sec'y.
Massachusetts Vet. Ass'n.....	Monthly.....	Boston.....	J. H. Seale, Salem.
Michigan State V. M. Ass'n.....	Feb. 7, 8, 1911...	Mich.Agr.Col.	Judson Black, Richmond.
Minnesota State V. M. Ass'n.....	Jan.12,13,14,1911.	St. Paul.	G. Ed. Leech, Winona.
Mississippi State V. M. Ass'n....	.....	.....	J. C. Robert, Agricultural Col.
Missouri Valley V. Ass'n.....	Jan. 24,25,26, 1911	Kansas City..	Hal. C. Simpson, Denison, Ia.
Missouri Vet. Med. Ass'n	.....	.....	D. L. Luckey,
Montana State V. M. A.....	.....	Helena.....	W. S. Swank, Miles City.
Nebraska V. M. Ass'n.....	.....	Grand Island.	H. Jensen, Weeping Water.
New York S. V. M. Soc'y.....	Aug. 1911.....	Brooklyn	H. J. Milks, Ithaca, N. Y.
North Carolina V. M. Ass'n.....	.....	.....	W. G. Chrisman, Raleigh.
North Dakota V. M. Ass'n.....	Jan. 1911.....	Fargo	C. H. Martin, Valley City.
North-Western Ohio V. M. A....	Feb. and Nov...	Lima.	A. J. Kline, Wauseon.
Ohio State V. M. Ass'n.....	.....	.....	O. V. Brumley, Columbus.
Ohio Soc. of Comparative Med..	Annually	Up'r Sandusky	F. F. Sheets, Van Wert, Ohio.
Oklahoma V. M. Ass'n.....	.....	.....	M. P. Hunt, Enid.
Ontario Vet. Ass'n.....	.....	.....	C. H. Sweetapple, Toronto.
Passaic Co. V. M. Ass'n.....	Call of Chair...	Paterson, N.J.	H. K. Berry, Paterson, N. J.
Pennsylvania State V. M. A.....	.....	.....	F. H. Schneider, Phila.
Philippine V. M. A.....	.....	.....	Chas. G. Thomson, Manila.
Portland Vet. Med. Ass'n.....	4th Tues. ea. mo.	Portland, Ore.	Peter Hanson, Portland, Ore.
Province of Quebec V. M. A.....	.....	Mon. and Que.	Gustave Boyer, Rigaud, P. Q.
Rhode Island V. M. Ass'n.....	Jan. and June..	Providence ...	J. S. Pollard, Providence
So. Illinois V. M. and Surg. A....	Jan. 3, 4, 1911....	Centralia.....	F. Hockman, Louisville.
St. Louis Soc. of Vet. Inspectors.	1st Wed. fol. the 2d Sun. ea. mo.	St. Louis.....	Wm. T. Conway, St. Louis, Mo.
Schuylkill Valley V. M. A.....	.....	.....	W. G. Huyett, Wernersville.
Soc. Vet. Alumni Univ. Penn.....	.....	Philadelphia..	B. T. Woodward, Wash'n, D.C.
South Dakota V. M. A.....	2d Tues. July '11	Watertown...	S. W. Allen, Watertown.
Southern Auxiliary of California State V. M. Ass'n.....	Jan. Apl. Jy. Oct.	Los Angeles..	A. D. Hubbell, Los Angeles.
So. St. Joseph Ass'n of Vet. Insp..	4th Tues. ea. mo.	407 Ill. Ave....	H. R. Collins, So. St. Joseph
Tennessee Vet. Med. Ass'n.....	.....	.....	A. C. Topmiller, Murfreesboro
Texas V. M. Ass'n.....	Call Exec. Com.	.....	R. P. Marsteller, College Sta.
Twin City V. M. Ass'n.....	2d Thu. ea. mo .	St.P.-Minneap	S. H. Ward, St. Paul, Minn.
Vermont Vet. Med. Ass'n	.....	....	G. T. Stevenson, Burlington.
Veterinary Ass'n of Alberta.....	.....	.....	C. H. H. Sweetapple, For. Saskatchewan, Alta., Can.
Vet. Ass'n Dist. of Columbia.....	3d Wed. ea. mo..	514—9th St., N. W.....	M. Page Smith, Wash., D.C
Vet. Ass'n of Manitoba.....	Not stated.....	Winnipeg.....	F. Torrance, Winnipeg.
Vet. Med. Ass'n of N. J.....	Jan 12, 1911	Trenton.....	W. Herbert Lowe, Paterson.
V. M. Ass'n, New York City.....	1st Wed. ea. mo.	141 W. 54th St.	W. Reid Blair, N. Y. City.
Veterinary Practitioners' Club....	Monthly.....	Jersey City ...	A. F. Mount, Jersey City.
Virginia State V. M. Ass'n	Jan. 13, 1911.....	Richmond	W. G. Chrisman, Raleigh.
Washington State Col. V. M. A ..	1st & 3d Fri. Eve.	Pullman.....	R. J. Donohue, Pullman.
Washington State V. M. A.....	.....	Seattle.....	J. T. Seely, Seattle.
Western Penn. V. M. Ass'n.....	1st Wed. ea. mo.	Pittsburgh....	F. Weitzell, Allegheny.
Wisconsin Soc. Vet. Grad	Jan., 1911.....	Madison.....	J. P. West, Madison.
York Co. (Pa.) V. M. A.....	.....	.....	E. S. Bausticker, York, Pa.

PUBLISHERS' DEPARTMENT.

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Rejected manuscripts will not be returned unless postage is forwarded.

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ABOUT RENEWALS FOR 1911.

As there is always a tendency for *new* subscribers to materialize with the NEW YEAR, the publishers take this occasion to urge those subscribers whose subscriptions have terminated with the year, to renew promptly; as there will be an unusual demand on the first few issues, and frequently, even with the best efforts to prevent it, some one of them becomes exhausted. Therefore, as we do not want any of the old subscribers to be disappointed, our suggestion is *renew promptly* and *directly to the* REVIEW *office.*

This interesting report of a case of mange was sent by Dr. Sweeney to the makers of the splendid product he used in its treatment; and believing it might be interesting to others, they have sent it to us for publication. Dr. J. H. Sweeney, Veterinary Surgeon, Suffolk, Va., speaks of his experience of Thigenol as follows:—"I received and have used your Thigenol with very good results, and will give you the history of a case I treated with it. A Pointer pup was sent to the country to be broke, etc. The owner went to the country one day to see him and to his surprise found the dog so weak as to be unable to stand; it had the worse case of mange I ever saw, extending from head to tail. The back was perfectly raw. The owner asked me to do something for it, so I used Thigenol 1 oz., Salicylic Acid 1 dram. and Petrolatum 3 ounces; made into an ointment. After washing dog with Tyroline 5 per cent. sol., apply ointment; repeat in three days.

This was done about two weeks ago and the pup to-day is lively as a cricket, weighs ten or twelve pounds more and patches are all healing over with new hair."

Only those who have used that excellent blend of the Oil of Sandal Wood and Saw Palmetto, that the OD. CHEMICAL CO. have given to the profession under the name of *"Sanmetto,"* thoroughly appreciate its efficiency in the treatment of bladder or kidney troubles, so frequently met with in the dog, and *always* a symptom in Azoturia of horses. Order some at once, as this *especially* is the season you will need it. You may get cold in your own kidneys—if you do, try it. Write the manufacturers for literature. Page 8 (adv. dept.) this issue.